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STATISTICS OF THE COLORED RACE IN THE UNITED STATES.

By President Francis A. Walker.

It is to the now defunct institution of chattel slavery that we owe the existence of one of the most important elements of our population,— the colored race.

The past history of this race within the United States is of deep, though painful, interest; while its future forms a subject of puzzling speculation, inasmuch as the question presents itself with much force, whether an element brought hither, in the first instance, compulsion, without any deference to, or consideration of, the motives which urged hither the original white settlers of this coast, or any subsequent body of colonists, can be maintained in its entirety and kept up to its relative importance, against the social and economic competition of the other elements of the population, now that the institution of chattel slavery has been violently broken down and the blacks have been, almost by act of war, placed in a state of legal equality.

I have said that it is to slavery we owe the presence of the African, in any considerable numbers, upon our shores. It is estimated that the Slave Trade has, first and last, taken from

Africa 40,000,000 of her people. How many of these contributed to the present negro population of the United States? The usual estimates of the importation of black slaves into the British Colonies prior to 1776 make the total number 200,000. The survivors and the descendants of these were computed to amount, at that date, to about 550,000. These estimates are, however, very rudely made. Even after the establishment of the present form of government and the inauguration of the series of national censuses we find Dr. Seybert lamenting that so little attention was paid to the blacks in the enumeration, on account of their being regarded solely as a species of property, without any consideration of the various sociological interests concerned with the facts of their numbers or their condition.

The occurrence of the Revolutionary war caused great disturbances among the colored people of the insurrectionary states, especially at the South. As the contending armies dragged their trains and camps alternately over the face of Virginia, the Carolinas, and Georgia, great numbers of slaves accompanied Tory masters, as these became refugees; great numbers deserted patriot masters for the more luxurious service of British officers, or to become camp followers of the redcoats. So much is known. It is also to be conjectured, almost with certainty, that the rate of mortality among this portion of the population was considerably increased through the hardships of the protracted war, and that the importation of slaves was somewhat checked by the condition of things existing between 1775 and 1783.

It was this depletion of the normal supply of slave labor through the effects of war which gave weight to the demands of the representatives of the planting states, in the Constitutional Convention of 1787, that their communities should be allowed a moderate period in which to replenish the slave markets before all further importations should be cut off by Constitutional inhibition. They argued that their labor system had been inherited by them; that, it being what it

was, their constituents were suffering from losses (of this species of property) which had been brought upon them by their devotion to the common cause of all the states — independence of Great Britain — and that they should not be punished for their patriotic endeavors.

It was in consequence of representations like these that the Constitution of 1787 was made to contain a provision that the power of Congress over commerce with foreign nations should not be exercised to prohibit the importation of slaves prior to 1808, twenty years, that is, from the year in which it was anticipated the Constitution would be ratified.

The first census, 1790, discovered the number of colored persons in the United States to be 757,208, of whom 59,527 were free, the latter number being about equally divided between the free states and the slave states, the free blacks of North Carolina being 4975; of Virginia, 12,866; of Maryland, 8043; of Delaware, 3899.

The colored element at this census constituted a larger proportion of the population than ever after, viz., 19.3 per cent.

By 1800 the colored element had increased absolutely to 1,002,037, being a gain of 32.33 per cent; but had declined relatively to 18.9 per cent of the entire population. The free colored had risen to 108,435.

By 1810 the colored element had reached 1,377,808, a gain of 37.5 per cent upon its own numbers in 1800, and of 81.96 per cent upon its own numbers in 1790. It had, also, advanced slightly towards its former share of the total population of the country, being now 19 per cent of the whole. The free colored had risen to 186,446. The admission of Louisiana brought in nearly 50,000 colored persons, of whom six-sevenths were slaves.

One cause of the increase in the colored population of 1810 over 1800 had been the stimulation of the slave trade, due to the near approach of that date on which, to the honor of the American name, it became a thing forever after prohibited, — a felony, and, by statutory definition, piracy.

I have tried in vain to secure reliable information regarding the importation of slaves, under the permission of the Constitution, between 1790 and 1808. Mr. H. C. Carey, in his work "A History of the Slave Trade," puts the number at 90,000; but I have been unable to ascertain that Mr. Carey had sufficient data for the construction of more than a highly conjectural estimate. The only positive source of knowledge appears to be the customs records of the port of Charleston, S. C.

By 1820 the number of the colored had risen to 1,771,656, a gain of 28.59 per cent in ten years, of 76.8 per cent in 20 years, and of 133.97 per cent in 30 years. Its share in the total population of the country had sunk to 18.4.

By 1830 the number of the colored had increased to 2,328,642, a gain of 31.44 per cent in 10 years; of 69.01 in 20 years; and of 132.39 in 30 years. Its share in the total population had still further sunk to 18.1. The acquisition of Florida had added 16,345 colored, against 18,385 whites.

By 1840 the numbers of this race had risen to 2,873,648, a gain of 23.4 per cent in 10 years; of 62.2 per cent in 20 years; and of 108.57 per cent in 30 years. The number of free colored was then 386,293, being 13 per cent of the total colored. The share of the colored element in the total population of the country had fallen to 16.8.

By 1850 the number of the colored had risen to 3,638,808, a gain of 26.63 per cent in 10 years; of 56.26 per cent in 20, and of 105.39 per cent in 30 years. This element then contributed 15.7 per cent to the population of the country.

The acquisition of California, Texas, New Mexico, and Utah during the above period had added 331,611 whites and 59,799 colored to our population, the two elements in the new territory having about the same numerical relation as throughout the United States at large.

The next step brings us to the threshold of the war which wrought such tremendous changes in the condition and prospects of the colored race in the United States, and which at

a blow destroyed that relation which alone could have induced the presence of any considerable body of Africans upon our soil.

In 1860 the number of the colored had risen to 4,441,880, being a gain of 22.07 per cent in 10 years, of 54.57 per cent in 20 years; and of 90.74 per cent in 30 years. The proportion of this element to the total population was 14.1 per cent; that is, one-seventh of the inhabitants of the United States were then colored. The free colored were 488,070.

Four years of war ensued. Had Congress, in an enlightened view of the immense importance of ascertaining precisely where that great struggle left us, provided for the taking of a census, in 1865, with improved modern machinery of enumeration, we should have obtained results of almost priceless value. Unfortunately, however, the attention of our politicians was fixed on matters of very much less consequence. Not only was no special enumeration resorted to in 1865, but when the time approached for taking the ninth census, in 1870, the Senate rejected a bill, prepared chiefly by the labors and services of Gen. Garfield, which had passed the House of Representatives by an immense majority.

The country was thus thrown back upon the existing law regulating the enumeration, a law which had always been defective in its provisions, but which had become as inadequate to the work requiring to be done in 1870 as the old smooth-bore, muzzle-loading Queen's arm of the Revolution would be to meet the demands of modern warfare. Bad, however, as was the law, the political situation greatly aggravated its defects. The South was then in a state of intense agitation; portions of it almost in a race-war; the Kuklux outrages were at their height on the one side, while the carpet-bag governments, sustained by federal force, were doing their worst to alienate all friends of law and order, of public decency and public honesty.

It was in such a situation that the Census of 1870 was to

be taken; and, instead of entrusting the local supervision of this important work — a work requiring in an eminent degree the confidence and the cheerful co-operation of all classes and all parties — to persons specially appointed for the purpose, chosen for their supposed fitness for the task, and so chosen as to win popular support to the enumeration, instead of this the local supervision of the census in the Southern states was, by the defeat of Gen. Garfield's bill, thrown back into the hands of the Marshals of the United States Courts: officers thoroughly identified, at every point, with the party and race struggles that had convulsed society from 1865 to 1870; officers necessarily unpopular in an intense degree, even if through no fault of their own, among the most enlightened and normally influential portions of their several communities; officers appointed for another purpose, and amenable to a different department from that to which the census is assigned; officers chosen without the slightest reference to their capability for, or their interest in, statistical work; officers, some of whom were intelligent, honest, and patriotic, some of whom, like too many federal officials at the South during the period in question, lacked one or more of these qualifications; officers, every one of whom, if he had possessed otherwise all the qualifications that could be desired for such a service, had enough, and more than enough, in the way of his regular duties, in the enforcement of the revenue and other laws of the United States, in those troubled districts, in those troublous days, to occupy every moment of his time from January to December. And, as the Census Office had no part in the selection of these prime agents, so it had no part in the selection of their subordinate agents, the so-called Assistant Marshals, the actual enumerators of the population. Not even a veto could be exercised at Washington.

Good, actually good, appointments were not even to be expected as a general thing. The whole battle against the Garfield bill had been fought on the question of patronage.

It was for the avowed purpose of retaining this large body of more or less lucrative appointments in the hands of the dominant party that the United States Marshals rallied in Washington, during the winter of 1869–70, to defeat the House measure. They wanted to use these thousands of offices as a means of strengthening their hands in their respecpective districts, to fight the Kuklux and the illicit distillers; to build up the republican party and consolidate the negro vote. And, in general, this was precisely the use to which those offices were put. Some Marshals, especially in states which had a large and respectable white republican vote, as in Virginia, West Virginia, Kentucky, Tennessee, North Carolina, and Missouri, found it compatible with party interests to appoint intelligent enumerators; and in some districts the work was as well done as in any at the North or West. In other districts, where the newly enfranchised negroes constituted 40, 50, 60, 70, or even 80 per cent of the population, and where the whites, with a few insignificant and often disreputable exceptions, were banded together within the democratic party, the power of appointment was exercised to the inexpressible injury of the census service. Negroes who could not write or read were selected for this difficult, delicate, and responsible duty. Accompanied, perhaps, by some poor white man, with such clerical accomplishments as might be expected, these officers of the law pushed their way into mansions where their intrusion was resented as an insult, or sought to traverse the bridle-paths of extensive districts — districts three or four or five times as large as could properly be assigned to single officers — to find the hundreds and thousands of log-houses in which the poorer part of the population, white or black, found shelter.

No one who is familiar with the conditions of life at the South will hesitate to admit that it would be a work of the greatest difficulty for a man of more than average intelligence, with an instinct for topography and a fair knowledge of woodcraft and accustomed to the saddle, to traverse a dis-

trict containing 400 square miles, in a broken and wooded country, and not, in spite of the utmost diligence and fidelity, fail to come upon scores of cabins, hidden away in ravines, or in the depths of forests, often without so much as a bridle-path leading up to the door. It would often be no small task to find such a cabin, even if you knew it was somewhere in the neighborhood, and were specially looking for it and for it alone. The chance of missing it, when you had no information of its existence, and were only looking around for human abodes in general, would be very great indeed.

But why protract the miserable story of a most difficult, delicate, and important work sacrificed to the maintenance of carpet-bag governments, or to the exigencies of the judicial department in its contest with the Kuklux and the illicit distillers, or to even less creditable purposes of party managers. The result was an enumeration which we now know from indisputable evidence to have been in many parts of several Southern states inadequate, partial, and inaccurate, often in a shameful degree.

The number of colored persons returned in the Census of 1870 was but 4,880,009, a gain of only 9.86 per cent in 10 years; 34.11 per cent in 20 years, and 69.82 per cent in 30 years, leaving this element but 12.7 per cent of the total population.

The reason why so great a reported falling off, not in the colored population absolutely, but in their previously sustained ratio of increase, did not excite incredulity, did not arouse challenge, was the intervention of the war since the Census of 1860, a cause that seemed potent enough to account for almost any effect. This country had had no previous experience of a long desolating war within its borders to furnish any measure of the possible influence of such a force. It was not in the nature of the case unreasonable that the ratio of increase in this element of the population should have fallen off from 22.07 per cent between 1850 and 1860 to 9.86 per cent between 1860 and 1870. The slaves

had first been declared property contraband of war; and unknown numbers of them had escaped through the Confederate lines, or had followed the march of our armies, to become camp followers, or to herd miserably in cities and contraband camps, where the rate of mortality was known to be fearfully high, as anyone can see for himself by looking at the cemetery at Arlington, near Washington. Then the slaves had been declared free; and it was not irrationally argued that, wholly unaccustomed to care for their own wants, or to direct their own movements, the negroes had, when once the control of their masters was withdrawn, pursued courses and suffered hardships which had not, indeed, actually reduced the numbers of this people, but had sharply checked their rate of increase. Still again, it was credibly asserted that child-bearing had been associated in the minds of the negroes with slavery; and that, freed from the dictation of their former masters, and revelling in an unaccustomed freedom of movement and of indulgence in social and convivial life, the women of this race had diminished the birth rate purposely.

All these considerations are so perfectly rational in themselves, and coincided so well with the reports from the few Southern cities in which the registration of births, marriages, and deaths was maintained (the number of deaths among the colored population being reported often as high as 40 or 50 in 1000) that the figures for the colored population which were put forth in 1870 met with little or no serious challenge, but were generally accepted as representing, at least approximately, the facts of that year.

The Census of 1880, however, revealed unmistakably that the count of the colored population, in 1870, had been defective in several states, especially those which, like South Carolina and Mississippi, contained a very large excess of the colored element. This became evident from the first collocation of the figures of the Tenth Census; and local examinations, at the points where the greatest discrepancies

existed, proved conclusively that the Assistant Marshals of those districts, at the Ninth Census, had shamefully slurred over their work.

The count of 1880 showed 6,580,793 colored, an apparent gain over 1870 of 34.85 per cent; a gain — undoubted — of 48.15 per cent in 20 years, and of 80.85 per cent in 30 years.

For a time the spirit of party led some to contest the count of 1880; but the further investigation was carried, the more manifest it became that this count was essentially correct, and that the fault lay with the Census of 1870.

The reason for better work at the later date was found not merely in the restoration of peace, order, and comparative harmony throughout the lately disturbed section, together with the awakened interest of all classes of people in whatever might concern their social and industrial progress. That reason was found in a much higher degree in what might have been had just as well as not in 1870, viz., in sound provisions of law for the conduct of the enumeration.

By the Act of 1879, which was mainly based upon the Garfield bill of 1869–70, the supervision of the census was taken away from the Marshals of the United States courts and vested in Supervisors, appointed simply with reference to this service, and selected on account of their presumed qualifications therefor. These Supervisors gave, as a rule, their entire time for from five to eight months to the organization and conduct of this work. The Supervisors of 1880 were two and one-half times in number the Marshals of 1870, so that, with far more time at his command, each Supervisor was called to overlook a much smaller field. Supervisors were appointed from either political party, with the utmost impartiality. And, as they were themselves selected without regard to partisan services, they were officially instructed that it would be considered an offense and an abuse of trust if in their own appointment of enumerators they allowed partisan motives to appear. The enumerators of 1880, who succeeded to the work of the Assistant Marshals

of 1870, thus freed from supposed obligations to render party services, were largely taken from among school-teachers, county or town clerks, assessors, or other persons having familiarity with figures and facility in writing. All these appointments were subject to the negative of the Census Office, which fact alone was sufficient to prevent any considerable proportion of bad selections, inasmuch as the disappointed could at once enter protest at Washington; while, from the moment each enumerator began his work until the evening he closed it, he was bound to render a daily report to the Census Office on postal cards specially prepared for the purpose.

Most important of all, however, was the better supervision of the smaller enumeration districts of 1880. By the former law, districts might embrace as many as 20,000 inhabitants, not only causing the enumeration to be protracted over a long time, but requiring the enumerator to canvass an extensive district, and, by consequence, to work much of his term in country with which he was acquainted only in a very general way, or, more probably, not at all.

By the Act of 1879 districts were not to exceed 4000 inhabitants, and the Census Office was entrusted with the control of the formation of districts equally with the appointment of enumerators. As against the 6400 Assistant Marshals of 1870, 31,500 enumerators, each within a clearly defined district, were set to work on the 1st of June, 1880. In other words, after allowing for the extension of the settled area during the preceding decade, the average size of an enumeration district in 1880 was only about one-fourth that of an enumeration district of 1870; so that the agent of the government was kept at work always much nearer his home, upon ground he was familiar with, and among people many of whom he personally knew.

A score of minor points might be made in this comparison of the Act of 1879 with that of 1850, as establishing the agencies for the enumeration of the population, but the foregoing will suffice to show how it came about that, with a

better state of public feeling at the South, with an increased interest in the results of the census, and with improved machinery of enumeration, from the central office out to the remotest district of the land, the count of 1880 was at once so much more sweeping and so much more searching than that of 1870.

That the white population shared in some degree in the omissions resulting from the defective methods and negligent service of 1870 is beyond question; but it is only the probable loss among the colored which I shall consider in the remainder of this paper.

For the purposes of this inquiry let us bring together into one table the figures which we have given in connection with successive censuses. The table will then be constructed as follows:—

	Colored Population.	Per Cent of Total Population.	Increase, Per Cent.		
			10 Years.	20 Years.	30 Years.
1790	757,208	19.3	....	....	...
1800	1,002,037	18.9	32.33	....	....
1810	1,377,808	19.0	37.50	81.96	....
1820	1,771,656	18.4	28.59	76.80	133.97
1830	2,328,642	18.1	31.44	69.01	132.39
1840	2,873,648	16.8	23.40	62.20	108.57
1850	3,638,808	15.7	26.63	56.26	105.39
1860	4,441,830	14.1	22.07	54.57	90.74
1870	4,880,009	12.7	9.86	34.11	69.82
1880	6,580,793	13.1	34.85	48.15	80.85

It is by reference to the columns which present the increase, per cent, in the colored population by 20 years' and by 30 years' periods, that we find the clearest indication regarding the probable numbers of this element of the population in 1870.

It will be noted that there had been a continuous decline, though not at a uniform rate, in the per cent of increase by 20 and by 30 years' periods from the beginning. This movement was apparently still in progress when the war occurred

in 1861. Nothing is known to have occurred between 1860 and 1870 which was of a nature to reverse the previous course of decline in this element. On the contrary, while the public mind, in anticipation of the Census of 1870, exaggerated the exceptional losses of the decade among the colored population, those losses must have been severe and extensive. Although on the old plantations something like the habitual rate of increase may have been maintained, there is an overwhelming concurrence of testimony that in camps and cities the mortality of the colored people had been excessive. We conclude, therefore, that it would be in the highest degree irrational to assume that the rate of increase among the colored population during the 20 years' period was greater than during the corresponding period ending in 1860.

1. Let us see what would have been their actual numbers in 1870, provided the rate of increase in the 20 years' period ending in 1870 had been found to be precisely the same as in the corresponding period ending in 1860, viz., 54.57 per cent. In this case we should have a colored population of 5,624,505; and our table for the later decades would have to be reconstructed as follows: —

	Colored Population.	Per Cent of Total Population.*	Increase, Per Cent.		
			10 Years.	20 Years.	30 Years.
1860	4,441,830	14.1	22.07	54.57	90.74
1870	5,624,505	14.3	26.63	54.57	95.72
1880	6,580,793	13.1	17.00	48.15	80.85

*In constructing this and the following tables, the total population for 1870 has, of course, been increased by the same amount as the colored population.

Here we see that, on such an assumption, the colored in 1870 contributed a larger proportion of the population than in 1860. Again, this would make the rate of increase for those ten years 26.63 per cent, although it had been only 22.07 per cent during the ten years preceding, and sank to

17 per cent in the ten years following. Again, this would make the rate of increase in thirty years 95.72 per cent, although it had only been 90.74 per cent in the 30 years ending 1860; and was found to be only 80.85 per cent for the 30 years' period, 1850–80. Do we need to accumulate more improbabilities as against this assumed ratio?

2. Let us inquire what would have been the actual number of the colored in 1870, provided the rate of increase had been the same for the 30 years ending 1870 as for the corresponding period ending 1860, viz., 90.74 per cent. In this case there would have been a colored population of 5,489,196; and our table would have to be reconstructed for the later decades as follows:—

	Colored Population.	Per Cent of Total Population.	Increase, Per Cent.		
			10 Years.	20 Years.	30 Years.
1860	4,441,830	14.1	22.07	54.57	90.74
1870	5,489,196	13.9	23.29	50.50	90.74
1880	6,580,793	13.1	20.06	48.15	80.85

Here we, indeed, find the share of the colored in the total population to be between that of 1860 and that of 1880, and the rate for the 20 years' period ending 1870 falls between that for 1860 and that for 1880 (1860, 54.57; 1870, 50.50; 1880, 48.15); but the gain per cent between 1860 and 1870 is made to be greater than that between 1870 and 1880 in the proportion of 23.39 to 20.06, while remaining even greater than for the preceding period. Now, if it be true that the influence of the war and of sudden and violent emancipation, often followed by wide dispersion, was in some considerable degree, higher or lower, unfavorable to the increase of the colored population between 1860 and 1870; and if no compensating cause can be adduced (and I do not know that any has been suggested), then such a ratio for the 20 years' period ending 1870 cannot reasonably be assumed.

3. We have said that it would be in a high degree irrational

to assume that the ratios for the several periods ending in 1870 could have been greater than for the corresponding periods ending in 1870; and we have seen what would be the effect of assuming these ratios to be actually the same. Let us now see what would have been the colored population of 1870, and what its relations to the white population, etc., had the ratios prevailing for the several periods ending in 1870 been the same as those for the corresponding periods ending in 1880. And, first, let it be supposed that the ratio for the 20 years ending in 1870 was that which prevailed for the 20 years ending 1880, viz., 48.15. Applying this ratio of increase to the colored of 1850, we should have for 1870 a colored population of 5,390,894; and our table would be reconstructed as follows: —

	Colored Population.	Per Cent of Total Population.	Increase, Per Cent.		
			10 Years.	20 Years.	30 Years.
1860	4,441,830	14.1	22.07	54.57	90.74
1870	5,390,894	13.8	21.37	48.15	87.59
1880	6,580,793	13.1	22.07	48.15	80.85

Here the figures for 1870 are in each case, except in respect to the one assumed common ratio, found between those for 1860 and those for 1880. The total colored population is, in round numbers, 950,000 above that of 1860, and 1,200,000 below that of 1880. The proportion of the colored to the total population, which was 14.1 in 1860, sinks to 13.8 in 1870, to fall further to 13.1 in 1880.

4. So far the process of the figures for 1860 to 1880 is in the direction indicated by the table generally. Let us, however, try to secure a result which shall be even more clearly self-consistent. We will assume that the ratio of increase for the 30 years' period ending in 1870 was the same with that for the corresponding term ending in 1860; and then see how our table will be constituted on this assumption.

	Colored Population.	Per Cent of Total Population.	Increase, Per Cent.		
			10 Years.	20 Years.	30 Years.
1860	4,441,830	14.1	22.07	54.57	90.74
1870	5,206,992	13.4	17.22	43.09	80.85
1880	6,580,793	13.1	26.38	48.15	80.85

I confess that the figures given above seem to me to represent not unfairly the probable colored population of 1870 and its relations to the general population and to its own past. Somewhat between three and four hundred thousand I believe to have been the loss by defective enumeration. The fall in the ratios of increase during the several periods from 22.07 for 10 years to 17.22; from 54.57 for 20 years to 43.09; from 90.74 for 30 years to 80.85 is to be attributed to the social confusion and the enhanced mortality of four years of war between 1861 and 1865, partially recovered from during the five years of peace, indeed, but still of social and political turmoil, immediately following.

HOW TO MAKE STATISTICS POPULAR.

By Charles F. Pidgin.

Read Before the Association Oct. 30, 1890.

I have been requested by your Secretary to present a paper upon the subject "How to Make Statistics Popular." The time allotted me, twenty minutes, will not allow of an extended opportunity for consideration or illustration, but I shall be able to present briefly a survey of the wide field to be covered, to consider the agencies now engaged in the work, to examine the results of their labors, and to make some suggestions in regard to the establishment of new agencies for propagandism, and concerning new methods of work.

My first experience in statistical work was in 1873, when I became connected with the Bureau of Statistics of Labor, my service with which will form a consecutive period of eighteen years in June next. I well remember a quotation from a letter from a distinguished statistician of the United States which appeared in the report for 1874. The words were: "The country is hungry for information; everything of a statistical character, or even of a statistical appearance, is taken up with an eagerness that is almost pathetic."

At that time the results of the Ninth United States Census were being given to the public. The Massachusetts Bureau of Statistics of Labor had been established for four years, but its labors had been declarative and argumentative rather than statistical.

The demand of the people to know themselves was answered by the action of the people's servants,—the legislators. Bureaus of labor, agriculture, industries, mines, etc., were organized in the different states. The new states of North Dakota and South Dakota established such bureaus

by constitutional provisions, instead of by statute as in the older states. Today we have twenty-three state bureaus and the National Department of Labor. To these must be added the Bureau of Statistics of the Treasury Department at Washington, which supplies us with statistics of imports, exports, and immigration. The Bureau of Statistics of the State Department furnishes reports from the Consular Agents of the United States. These statistics relate, principally, to wages, prices, and markets. A few of the states issue registration reports,— or statistics of births, marriages, divorces, and deaths. The foreign governments are prolific in such statistics, technically called "movement of the population." Massachusetts has forty-two reports in its Public Document series, and those relating to education, insurance, savings banks, prisons, health, lunacy, charity, railroads, labor, and manufactures are largely statistical. On the quinquennial and decennial periods come the State and National censuses. The foreign governments supply statistics on nearly every subject, statistics of manufacturing industries, on the Massachusetts plan, being the most notable omission. The National Government issues a series of departmental and bureau reports which appreciably swell the aggregate of annual statistical material. To this mass of material we might add the reports of Boards, Associations, Societies, etc., which add yearly to our statistical accumulations.

Judging from this statement of the growth of statistical offices and the conditions of plenty as regards statistical material, one might be led to say that statistics were assuredly popular at the present day. But are they? Are not statistics usually called "dry"? Do not writers as a rule omit them from their articles, and do not orators eschew them except during the excitement of a congressional election? In the old days, I mean when I first became interested in politics, we had "roorbacks," or campaign stories. The politicians understood them, but the people did not, and they had some effect. These were literary "roorbacks," or juggling with

words. Now we have statistical "roorbacks," or juggling with figures, and neither the politicians nor the people understand them.

I have summarized our sources of statistical material. What are our agencies for statistical assimilation? How shall this material be put into shape for the popular mind? The average citizen is too busy a man to examine all these publications for himself; and as the editions are not large enough to supply every citizen with a copy, manifestly a large proportion of the community must obtain its statistics from the newspapers, from periodicals, or from works devoted to special subjects which present the contents of many volumes in a condensed form in one pamphlet or book.

The printing press is the most potent aid that the statistician possesses. As I have remarked, few at the present day care to listen to an address or lecture full of statistics. They may appeal to the eye, but rarely attract the ear. This suggests a potent method of reaching the public ear with statistics. Bring them into text form,—change the perpendicular columns of figures into horizontal lines of words, and instead of comparing one long number with another number, perhaps even longer, bring everything to the basis of percentages. If I say that out of 46,918,206 persons in the German Empire 23,459,103 have blue eyes and flaxen hair, I leave upon my audience no impression that they can carry away with them; but if I say that 50 per cent, or one-half, of the inhabitants of the German Empire have blue eyes and flaxen hair, I have supplied them with a statistical point that should linger in their minds.

So, in the published report itself, it may be allowable to draw conclusions, to make deductions, but they should be put in clean-cut paragraphs or, better still, short sentences, so that the busy man may read and remember.

The newspaper can be of incalculable service in disseminating statistical information. It speaks often to large audiences; it adds to the fame of the statistician and to the

education of its readers by publishing the results of statistical investigations. The newspaper editor is a busy man. Perhaps he has both the ability and the inclination to take a large volume of statistics and boil it down for his readers, and perhaps he has not. In either case it may be that he cannot spare the time; the book is put to one side; and when the time *is* found the statistics are "old,"—that is, they have been discussed by other papers, and it is too late to write a review.

This state of affairs can be largely remedied *if what a statistical volume means* is brought into a few compact paragraphs by the statistician himself and made so conspicuous by kind of type or prominent position that the busy editor sees it and transfers it to the columns of his paper.

The preparation of abstracts by the statistician may seem to have a "cut and dried" appearance; but it must be remembered that this abstract is always given as an item of news, and not as an editorial utterance,—that is, the newspaper does not necessarily endorse the conclusions contained in the abstract.

Something is being done to popularize statistics. In the first place, I am glad to note that the Census Office gives percentages of increase or decrease with its population figures. This plan will undoubtedly be followed in the various bulletins to be issued. In addition, the Superintendent of the Census has appointed a Special Agent for Abstracts and Items. It will be his duty to supply old channels, and to discover new channels into which statistics can be advantageously sent. He will have a classified list of every newspaper and periodical in the country. He will also have a list of the writers and speakers who use statistical material in their articles or addresses. Not only will he supply to newspapers, writers, and speakers the information contained in Census Bulletins and Reports, written in popular form in abstracts and in items of various lengths, but he will also endeavor to learn what special statistics or new combinations

of results are desired: and, if possible, such statistics will be prepared and sent to the parties desiring them. These abstracts and items will be printed on one side of the paper only, so as to be immediately available as copy, and between the items white spaces will be left, so that the party using them can cut them out and make them part of his article or speech. Each Special Agent of the Census deals with his own specialty, and each Bulletin and published Report will have the distinctive treatment of the department from which it comes. It will be the duty of the Special Agent for Abstracts and Items to correlate this material, that is, to write abstracts and items containing results drawn from various Bulletins or Reports, and brought together in such a way as to show correlated results that the individual handling of Bulletins and Reports would not supply. These abstracts and items, honestly and scientifically prepared, and supplied free of expense to all who may desire them, together with their appearance in the entire press of the country, will have a potent influence in educating the people to read and remember statistical results; and that is what I mean by "making statistics popular."

With its Report for 1889, upon being authorized by the Legislature, the Massachusetts Bureau of Statistics of Labor introduced a new plan of issuing its annual reports. Being composed of Parts, each distinct in itself, these Parts are issued as soon as ready in pamphlet form. A double purpose is secured by this method of publication. The statistics reach the public earlier, for Part I is not held back several months until the entire Report is ready. Again, the newspapers give as much space to the consideration of one of these Parts as they formerly did to the entire Report. This means a gain to the Bureau, the newspapers, and the public. It would seem that this plan could be advantageously followed in the publication of census volumes. Then each subject could be issued in pamphlet form as soon as ready without waiting a year or more for the complete volume. This plan

would also do away with the too often cumbersome general analyses, for each part or section would necessarily be accompanied by its special analysis.

The Massachusetts Bureau of Statistics of Labor will present three statistical novelties in its Reports for 1890 and 1891. The first one will be a "Labor Chronology." We read in the papers from day to day of strikes in Massachusetts, in other states of the Union, and in foreign countries. We read also of movements in the many phases of the labor question, — co-operation, building associations, new trades unions, labor legislation, the starting of new industries or the marked development of old ones, the deaths of prominent labor reformers, the Janus-like effects of the tariff,— in fact, the daily record of industrial progress, decline, or conflict. The "Labor Chronology," as its name indicates, will supply a condensed history of all such points for the year 1890, and succeeding years. Not only will the arrangement be chronological, but it will be arranged also by subjects, so that the editor, politician, writer, or workingman can consult this chronology and find the year's history as regards strikes, co-operation, industrial partnership, growth of manufactures, labor legislation, or any other labor subject in which he may have a particular interest.

In the summary made of the twenty annual reports of the Massachusetts Bureau of Statistics of Labor it was shown that more space was devoted to the subject of wages, prices, and cost of living than to any other. The Wage Statistics comprehended from 1752 to 1883, or 131 years. In the Report for 1891 the statistics of wages and prices will be brought up to 1885. To enable comparisons with Massachusetts figures to be made, the Bureau will tabulate the entire returns contained in Volume XX of the United States Census of 1880, or nearly 700 quarto pages of statistics of wages and prices from 1830 to 1880. In addition, the wage returns and the statistics of prices of the necessaries of life found in the Bureau reports of the various states from their organization

to 1885 will be brought into line, as will also similar figures for Great Britain, Germany, France, Russia, and other European countries. The object in view is to bring the history of wages and prices forward to the latest possible date. The original transcripts will require fully 500,000 separate slips; and these must be sorted so as to bring out the details of each branch of occupation, sex, year, state or county, age, whether day or piece work, and the actual or average weekly wages; with regard to prices, the particular article, year, state or county, city or town (with population), and the price per established unit of weight or measurement. These half million slips will be speedily and accurately handled by machinery, and the results classified, as regards both wages and prices, as high, medium high, medium, medium low, or low. We can then see, at a glance, the relation of wages to prices, in the countries considered, for specified years.

The third departure from routine work will be the publication of a Statistical Abstract of Massachusetts Public Documents. The public document series now numbers forty-two publications, although all do not contain statistics. Such as do, however, will have their salient points compressed into a page or less, so that the mechanic, mill operative, or manufacturer can glean from a pamphlet of thirty pages the statistical essence of thousands of pages.

It is with no desire to interfere with the work of any other department that this condensation is undertaken. Its sole purpose is to make statistics popular by making them easily attainable, to express great facts in short sentences, so that the active pushing American can read as he runs and remember what he reads.

But more should be done. Permanent provisions should be made for the annual publication of the Statistical Abstract of the United States now issued by the Bureau of Statistics of the Treasury Department. Chief Brock has submitted to Congress the draft of a bill which provides that the various departments of the government shall supply the statistics

required for the Abstract. Even if this Abstract is provided for, but half is done that is required. The material must be still further condensed and sent broadcast over the country in the form of short abstracts in text form, and in the form of items so arranged as to be available for copy by simply cutting from the sheet, which should be printed on one side only.

There should also be a Central Statistical Bureau of the United States, to collect and assimilate the work of American and foreign statistical offices and bring their work into shape for comparison. As such an office would not undertake original investigations, but would deal with official reports, or with material collected by other parties, it would not be necessary that such an office should be conducted by the government. It would be much better to have it organized on a private commercial basis.

Such an office would supply its authorities with all its tabulations and presentations. It would be an office free from partisanship, for its proprietors would conduct it on a professional and financial basis. As long as it maintained this independent position its statistical value would be acknowledged.

Such a Bureau, from its vast collection of official and personal statistics, could prepare abstracts and items for the use of newspapers. It could prepare special statistics for editors, writers, merchants, statesmen, and others. It could publish small pamphlets on live subjects, giving in condensed form, at a small price, the results of original investigations from the published reports of statistical offices in all parts of the world. Its translators would put into graphic English, within a few days after their receipt in this country, the reports of foreign statistical offices, and the latest productions of individual foreign statisticians. Such a Bureau would naturally publish a statistical paper,—probably a weekly. It would contain original articles, biographies of leading statisticians with portraits, accounts of the principal

statistical offices in the world, personal items, reviews of statistical works, a record of the progress made in practical statistics; in fact, be "a trade paper," and a means of communication for those connected with or interested in the science.

To the American Statistical Association and to the Annual Convention of Chiefs and Commissioners of Labor Bureaus the people of America must look for the organization, or, at least, the generous encouragement, of all legitimate plans for making statistics popular, that is, for having statistical truths form part of the education of the progressive American.

The newspaper editor, the statistician, the special agent for abstracts and items, the statistical weekly, monthly, or quarterly, the Central Statistical Bureau,— in fact, all dispensers of statistics,— must supply them in such form that they will catch the eye, appeal to the mind, and linger in the memory. This, in my opinion, is the true answer to the inquiry —"How can Statistics be made Popular?"

THE STUDY OF RETAIL PRICES IN BOSTON AND VICINITY.

By WALTER F. COOK, S.B.

At the suggestion of Dr. Davis R. Dewey, Associate Professor of Economics, I undertook in the spring of 1890, as a basis for a thesis to be submitted for graduation at the Massachusetts Institute of Technology, an investigation of the variation of retail prices in Boston and its immediate suburbs.

For this purpose the following localities were chosen: the North End, the West End, East Boston, South Boston, Roxbury, the South End, Dorchester, the Back Bay, Brookline, and the central portion of Boston proper. In each district I endeavored to select those stores whose trade appeared to be typical for that section; and as nearly as possible I compared the prices of the same brand of goods. As far as possible also only such goods were selected as may be considered staples in their respective lines,—that is, not goods of one season only, but those kept in stock by ordinary dealers at all times. Goods which were likely to vary in price from day to day were avoided. The prices of the goods of one line were collected before those of another were begun, excepting where two lines of goods were kept in the same place, as in the case of groceries and provisions. The time occupied in collection was about three weeks in each line. The articles selected for consideration are divided into five classes: I, Groceries; II, Provisions; III, Dry Goods; IV, Drugs; V, Coal. A reference to the accompanying tables will show the names of the particular articles. In collecting the data a personal visit was made to the different dealers. Except where standard brands were priced, the goods were seen if possible. Some difficulty was encountered in getting these prices until the dealers were thoroughly satisfied that the information was not desired in the interest of some rival house, and in most instances the request was granted. In some places complete lists could not be obtained. Of course it is not to be inferred from the figures here presented that prices throughout a district necessarily conform in all cases to those quoted; these are only offered as prices of what may be termed the average establishments of the several districts.

Prices were obtained from eighteen grocery stores, sixteen provision stores, sixteen drug stores, thirteen dry goods stores, and twelve coal dealers. The grocery, provision, and drug stores exhibited the greatest variations, especially the latter; dry goods and coal prices were more uniform. Among the groceries Mocha coffee varied from 32 to 40 cents a pound; sugar showed the least variation of any article, for at fourteen places out of eighteen its cost was seven cents a pound, and at the other four seven and one-half cents. In the grocery and provision business the quality of the goods kept was more dependent upon the class of trade than it was in the three other trades studied. The prices obtained from the druggists showed the most extreme variations. Only two articles of those selected were found with the same price in all of the stores,— pressed herbs per pound, and black licorice per stick. Upon a patent medicine the extremes were 34 and 50 cents for exactly the same article. For a certain prescription the highest price was 50 cents and the lowest 25 cents, a difference of 100 per cent. With ammonia a difference of more than 300 per cent was found.

In the dry-goods trade no one district appears to possess any decided advantage over another in the prices of the articles selected, save in cambric and ticking. In groceries and provisions, however, no such general statement can be made. Coal per ton does not vary in price, but in small quantities the price is largely subject to agreements between the dealer and purchaser. The results of the inquiry are appended in the following tables: —

GROCERIES.		North End.		West End.		E. Boston.		S. Boston.		Roxbury.		Brookline.		Back Bay.		Boston.		
Flour	Bag.	$.85	$.85	.70-.90	$.90	$.90	$ 85	$.85	$.80	$.90	$.85	$.85	$.85	$.85	$.80	$....	$...	$.85
	Lb.	.04	...	.05	.05	.05	.05	.04	.04	.04	....	.05	.04	.04	.04	.....	....	.05
Sugar	"	.07	.07	.07	.07	.07	.07	.07	.07½	.07	.07½	.07	.07	.07½	.07	.07	.07	.07
Rice	"	.07-.09	.06½	.06-.08	.06-.08	.07-.09	.08	.08	.08-.10	.08-.10	.07-.09	.07-.09	.09	.10	.09	.09	.09	.06-.08
Tea, Oolong	"	.25-.70	.50	.40-.75	.40-.70	.25-.75	.50-.75	.50	.30-.60	.70	.25-.75	.35-.70	.50	.50-$1	....	.40-1.50	.50-.75	.50-$1
Coffee, Mocha	"	.35	.35	.38	.35	.40	.38	.40	.35	.40	.32	.38	.36	.38	.38	.37	.37	.35
Beans	Qt.	.08	.08	.08-.10	.10	.08	.09	.09	.06-.10	.12	.06	.09	.10	.12	.10	.10	.10	.10
Molasses	Gal.	.45	.50-.60	.50-.60	.40	.35-.70	.40	.50	.45	.60	.55	.45-.60	.60	.60	.60	.60	.45-.60	.40-.60
Starch	Lb.	.06	.05	.06-.10	.06-.10	.06-.08	.08	.04	.08	.07	.05	.06	.08	.10	.10	.09	.06-.10	.06-.10
Codfish, dry	"	.07	.08	.07-.09	....	.10	.08	.10	.10	.08	.07-.09	.10	.10	.10	.10	.....	.08-.09	.06-.10
COAL.																		
One-half Bushel, 50 lbs.	....	.25	.25	....	.20-.25	....	....	.20	....	....	....	....	....	....	....	....	.20	....
One Ton	....	5.75	....	....	5.75	5.75	....	5.75	....	5.75	....	....	....	....	....	....	....	....
One-half Ton	....	3.00	....	....	3.00	3.00	....	3.00	....	3.00	....	....	....	....	....	....	....	....
One-quarter Ton	....	1.55	....	1.55	1.60	1.55	....	1.55	....	1.55	....	....	....	....	....	....	....	....
100 Pounds	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
PROVISIONS.														Dorchester.				
Beef, Sirloin	Lbs.	.25	.25	.25	.28	.25	.25	.25	.25	.25	.22	.28	....	.25	.25	....	.25	.25
" Rump	"	.25	.25	.28	.28	.25	.25	.25	.25	.25	.25	.28	....	.25	.25	....	.25	.23
" Corned, Brisket	"	.10	.10	.10	.12-.15	.10	.10	.10	.12	.12	.11	.14	....	.12	.09	....	.09	.10
" " Flank	"	.05	.06-.08	.05	....	.08	.08	.04	.05	.05	.06	.10	....	.10	.09	....	.05	.04-.05
Soup Stock	"	.03	.04-.05	.04-.06	.05	.03	....	.03	.02	.03	....	....	....	.05	....	....	.03	.03
Mutton Chops	"	.16	.20	.25	.20	.14	.15	.16	.20	.25	.22	....	....	.25	.25	....	.15	....
" Leg	"	.12½	.16⅔	.15	.18	.14	.15	.14	.18	.18	.13	.17	....	.20	.18	....	.14	.10
Veal, Leg	"	.12	.15	.14	.25	.14	.15	.14	.18	.18	.16	....	....	....	.25	....	.14	.09-.13
Sausages	"	.10	.12	.12	.16⅔	.10	....	.12	.10	.12	....	....	....	.12	....	....	.10	.10
Pork Chops	"	.10	.12	.12	.12½	.10	.10	.10	.09	.12	.11	.12	....	.12	.20	....	.10	.14
Chicken	"	.18	.20	.18	.20	.25	.18	.20	.18	.20	....	.33	....	.30	.15	....	.20	.20
Fowl	"	.15	.16⅔	.17-.18	.20	.16	.18	.16	.16	.18	....	.20	....	.20	....	....	.14	.10

Drugs.		North End.		West End.		E. Boston.		S. Boston.		Roxbury.		Back Bay.		South End.		Dorchester.		Brookline.		Boston.	
Aloes	Oz.	$.05	$...	$.10	$.10	$.05	$.05	$.10	$.05	$.15	$.15	$.15	$.15	....	$.15	....	$.10	$.05	....	$.05	....
Ammonia	Pt.	.25	.25	.50	.25	.25	.20	.25	.15	.40	.40	.20	.40	....	.30	....	.25	.35	....	.15	....
Alcohol	Pt.	....	....	.50	.40	.40	.40	.40	.50	.40	.40	.40	.40	....	.50	....	.40	.40	....	.35	....
Camphor	Lb.	.60	....	.80	....	.65	.65	.65	.65	....	.80	.65	.62	....	....	....	....	....	....	.58	....
	Oz.	....	....	.05	....	....	....	.05	.05	.08	.10	....	....	....	.15	....	.05	.05	....	.05	....
Epsom Salts	Lb.	....	.20	.15	.15	.10	.10	.10	.25	.15	.25	.15	.25	....	.10	....	.08	.05	....	.10	....
Flax-seed Meal	Lb.	.10	.10	.15	.15	.10	.10	.10	.15	.15	.15	.15	.15	....	.15	....	.18	.15	....	.10	....
Hops, pressed	Oz.	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	.05	....	.05-.06	....	.05	.05	....	.05	....
Horsford's Acid Phos.		.40	.40	.50	.40	.35	.35	.50	.45	.40	.50	.40	.45	....	.50	....	.50	.50	....	.34	....
Licorice, black	Stick.	.05	.05	.05	.05	.04	.05	.05	.05	.05	.05	.05	.05	....	.05	....	.05	.05	....	.05	....
Quinine Pills, 2 gr	Doz.	.30	.15	....	.10	.15	.15	.20	.15	.15	.30	.15	.. .	....	.15	....	....	.25	....	.12	....
Sulphur	Lb.	.10	.05	.15	.15	.15	.10	.10	.25	.15	.15	.15	.20	....	.25	....	.08	.15	....	.10	....
Prescription		.35	.35	.30	....	.45	.25	.50	.25	.50	.35	.45	....	....	.50	....	.40	.40	....	....	....

Dry Goods.		North End.			West End.		E. Boston.		S. Boston.		Roxbury.		Dorchester.		Boston.		South End.	
Cotton, unbleached	Yd.	.10	.08	.08	.09	....	.08	.09	.09	....	.08	.10	....	.08	.09	.08	.08	....
" bleached	"	.10	.08	.09	.10	....	.09	.10	.09	....	.10	.09	....	.10	.10	.08	.10	....
" crash	"	.05	.05	.05	.05	....	.05	.04	.05	....	.05	.03	....	.05	.05	.04½	.05	....
Cambric	"	.07	.05½	.06	.06	....	.05	.06	.06	....	.06	.04	....	.06	.04	.05	.06	....
Oil Cloth, table	"	.25	.20	.25	.25	....	.25	.25	.25	....	.25	.19	....	....	.25	.25	.25	....
Shirting, prints	"	.06½	.07½	.06	.06	....	.06	.05	.06	....	.06	.05	....	.05	....	....	.06	....
Silicia	"	.12½	.12½	.12½	.12½	....	.12½	.12½	.12½	....	.12½	.12½	....	.12½	.12½	.12½	.12½	....
Ticking, A. C. A.	"	.18	.16	.16	.15	....	.16	.18	.18	....	.20	.16	....	.18	.17	.15	....	....
Whalebones	Lb.	.15	....	.12½	.15	....	.12	.13	.13	....	.17	.12½	....	.15	.13	.14	.13	....
Spool Thread, cotton		.05	.05	.05	.05	....	.05	.05	.05	....	.04	.04	....	.05	.04	.04	.05	....
" " silk		.10	.10	.10	.10	....	.10	.08	.10	....	.10	.08	....	.10	.10	.10	.10	....

REVIEWS AND NOTICES.

LABOR STATISTICS.

Twentieth Annual Report of the Massachusetts Bureau of Statistics of Labor. Horace G. Wadlin, Chief. December, 1889. Boston. Pp. xxv, 694.

A large portion of this Report is taken up with the presentation of the Statistics of Wages. This subject has proved a very attractive one to the state Bureaus, as it has to popular writers, but, as has frequently been pointed out, most if not all former reports have occupied their space with deceitful averages.

Scientific statisticians have often proven that "the general average wage" means absolutely nothing, and the Massachusetts Bureau has done more than any other to correct the fallacies that have arisen.

Part V of the present Report is a suggestion and praiseworthy effort to give truly valuable tables. After criticising the inaccuracy of the general average rate of wages, the compiler presents a series of tables showing for each group of industries the number of persons, male and female, receiving less than $5 per week, between $5 and 6, 6 and 7, 7 and 8, 8 and 9, 9 and 10, 10 and 12, 12 and 15, 15 and 20, and over $20. This is what has been called the classified wages method. The figures are old, being those of the Census of 1885, but the new presentation is very valuable. It would have added to the value of the columns headed "Male" and "Female" if they had been subdivided into "children" and "grown persons"; but this would have greatly increased the work, and some serious difficulties would have been encountered. Great credit is due to the Bureau for what it has done, and for the example it has set. It is understood that Col. Wright, whose advice was sought in this matter, is carrying on a similar investigation in the National Bureau at Washington, and it is to be hoped that others will soon follow and adopt the plan.

Part I, The Relation of Wages to the cost of Production, is also important. It is one of the first presentations of valuable figures on this interesting question, and a method which appears to be reliable has been adopted.

One thousand six hundred and fifteen different manufacturing establishments have been drawn upon to furnish the material, and these were so chosen as to represent all the classified industries of the Commonwealth. In these specified instances the question is asked and answered, What relation does the cost of labor bear to the cost of the product as it lies completed in the manufacturer's hands? The answers give three facts, the percentage of the total cost of production paid (1) in wages, (2) for raw material, and (3) for expenses not specified. These are again divided so as to give figures for a certain specified quantity of the article produced, and also for the whole establishment. The whole is neatly tabulated and given in full.

Tables are given which very well establish the claim of representativeness, and especially is it creditable that the larger and more important industries are the ones most fully reported.

The present results of the investigation are reached in the following conclusions, which are clearly stated and well represented in a table.

Classification of Wage Cost.	Range.		Product.		Persons Employed.		
	Highest.	Lowest.	Value.	Percentage Represen'd.	Males.	Females.	Total.
More than one-half	77.06	51.24	$15,991,687	2.37	14,819	1,576	16,395
Less than one-fifth	18.34	5.92	158,016,950	23.42	29,441	7,864	37,305
Between one-third and one-half.....	49.82	33.76	163,817,382	24.28	98,631	7,414	106,045
Between one-fifth and one-third ...	33.33	20.60	313,010,086	46.40	112,297	95,508	207,805
Totals.....	77.06	5.92	$650,836,105	96.47	255,188	112,362	267,550

1. In industries, in which the total value of goods made, as shown in the last decennial census, was $15,991,687, or 2.37 per cent of the aggregate value of goods made in the manufacturing and mechanical industries of the Commonwealth, the wage cost does not fall below one-half of the total cost of production. These are the industries in which the raw material is a crude substance of relatively low cost, as clay, sand, rough stone, etc., or in which a high degree of skill is required, as in watch-making and the like.

2. In industries, in which the total value of the goods made was $158,016,950, or 23.42 per cent of the aggregate, the average wage cost does not rise above one-fifth of the total cost of production. These

are industries in which the raw material or stock used is itself a manufactured article involving labor in its production, the value of such labor not appearing directly in the particular industry specified, or they are industries in which only a small amount of labor is involved.

3. In industries in which the value of goods made was $163,817,382, or 24.28 per cent, the wage cost was between one-third and one-half of the cost of production. "These are chiefly industries in which considerable technical skill is expended upon materials or articles of stock which have been previously subjected to industrial processes."

4. Most of the great factory industries are included in the fourth class, which pays from one-fifth to one-third in wages. This class produces goods to the value of $313,010,086, or 46.40 per cent of the aggregate, and employs 56.53 per cent of all the laborers in the industries under investigation.

There is nothing very remarkable in these conclusions, and their usefulness to science will be secondary, They are certainly in no degree popular, but this is not a fault.

The question now arises, how accurate are they? This Bureau is exceptionally well fitted by experience and in personnel for the collection of such statistics, but unfortunately it fails to tell us its exact methods, and the claim that the results are "thoroughly reliable" is not explained by particulars which it is highly desirable should be known to the public. The figures were of course obtained from the employers. They could not be found except in the books of the establishment. It is important that we should know what steps were taken to secure exact and truthful returns.

Part II contains statistics of Markets, Transportation, Imports and Exports, and Competition. Here again much space is occupied in showing that the returns are representative, and again the proof is reasonably satisfactory. Unfortunately, the figures are almost worthless. The question asked was "Where are the products of this establishment sold *principally?*" The last word vitiates the whole, for everything depends on what view the manufacturer took of it.

Add to this that the answers do not adhere to the intended division into Local, Home, and Foreign markets, but even split up into all sorts of confusing and illogical divisions, and the value of this portion is practically nullified.

Under the head Imports the answers to the question, "Are sales decreased by the importation of foreign-made goods?" are interesting

from a political standpoint, but their value is extremely doubtful, especially when we consider that they were collected in the face of a bitter political struggle. This hardly seems a proper subject for investigation by a state Bureau.

Part III, The Condition of Employees. This subject has been extensively treated by the Bureau in former years, and only portions of it are here noticed, such as Relief Funds, Libraries, Profit-Sharing, Hired Dwellings, Rent and Board, Dwellings owned by Employees. The information presented is derived from voluntary answers by manufacturers, and should be taken *cum grano salis.* It may, however, be considered fully as trustworthy as the letters of laborers which so largely fill some of the state reports; and, so far as it may be true, it is of greater value in proportion as the employer is more intelligent.

Part IV is especially valuable because Massachusetts is our great manufacturing state, and because this Bureau has made a specialty of Statistics of Manufactures. This Part is divided into three subjects:

(1) The date of establishment of existing firms and corporations.

(2) The names of founders of existing establishments and the date of the adoption of the present firm name.

(3) The growth of manufactures.

The information given here is derived from the replies to one of the questions of the schedule used to secure industrial statistics in 1885. Of the firms existing at that time 18 were established prior to 1700, the earliest date mentioned being 1636. Sixty-one per cent have been established since 1861, and 45 years (1841–85) cover the organization of 81.60 per cent of existing establishments. Of course this takes no account of the firms that have had their existence and gone out of business prior to 1885. This part forms a sort of introduction to the annual *Statistics of Manufactures*, published by the Bureau, and will be of great value in the future.

Part VI, Daily Working Time. In this part it is claimed that the returns are complete, covering all the establishments in each industry in operation at the time of the investigation. The tables are arranged on the classification principle employed in Part V, and are therefore not vitiated by false averages. The average enters slightly into the summaries, but does not seriously detract from their value.

The attempts at graphic representation in these two parts are not very successful.

Part VIII, Women in Industry. The Massachusetts Bureau has investigated many phases of this subject, having something about it in almost every report. Women are here considered, first, as partners and stockholders in manufacturing and mechanical industries, and, second, as employees in gainful pursuits in all branches of industry.

It appears from the tables that of the 28,294 partners engaged in manufacturing in the state, 1760, or 6.22 per cent, are women, and of 42,731 stockholders, 11,572, or 27.08 per cent, are women.

That the number of female employees in gainful pursuits has been increasing very rapidly is perfectly evident, but the rate of increase is not so easily determined. The figures here given only go back to 1865, and the differences in classification and in groupings reduce the possibility of comparison to a minimum.

FRANK S. HATHAWAY.

Columbia College.

THE UNITED STATES CENSUS BULLETINS.

No. 6. August 4, 1890. *Financial Condition of Counties.* By T. Campbell-Copeland. Pp. 26.

This inquiry covers the financial condition of 2,728 counties; of these about one-third, or 944, are free from debt. The gross debt of the rest amounts in 1890 to $145,693,840. The *net* debt and annual interest charges for the several groups of states is as follows: —

	Net Debt.	Annual Interest Charges.
New England,	$4,489,613	$189,709
Middle,	21,349,438	1,106,128
Southern,	20,536,734	1,408,991
Western,	66,580,677	4,411,553
The Territories,	2,388,192	201,993
	115,344,654	7,318,374

The various financial characteristics of the several groups of states are illustrated by a large number of maps. From the standpoint of clearness it may be questioned whether the symbols chosen are sufficiently simple to be of great advantage in interpreting the data.

No. 7. Aug. 6, 1890. *Indebtedness of States in 1880 and 1890.* By T. K. Upton. Pp. 4.

This concise summary shows that state debts have decreased as follows: —

	1880.	1890.	Decrease.
Bonded debt,	$254,903,212	$194,800,371	$60,102,840
Floating "	41,514,309	43,596,218	*2,081,908
Total,	$296,417,521	$238,396,590	$58,020,931

* Increase.

Of the $58,000,000 decrease, $28,523,165 is to be accounted for by an enforced refunding of the old debt into a new one at a discount varying from 20 to 85 per cent.

No. 8. Aug. 8, 1890. *Production of Slate.* By William C. Day. Pp. 10.

Contains a statement of the production of slate in 1889. It appears that the roofing slate product is nearly double that of 1879. Tables also show the capital invested, and the average number of employees. A directory of firms producing slate is appended.

No. 9. Aug. 20, 1890. *Production of Pig Iron.* By Dr. Wm. M. Sweet. Pp. 8.

This is valuable for the prompt publication of statistics collected for the year ending June 30, 1890. It affords complete data for showing not only the immense development of this industry, but the territorial shifting of the centre towards the south. The comparative table is as follows: —

Districts.	Tons of 2,000 pounds.		
	Year ended May 31, 1870.	Year ended May 31, 1880.	Year ended June 30, 1890.
New England States	34,471	30,957	33,781
Middle States	1,311,649	2,401,693	5,216,591
Southern States	184,540	350,436	1,780,909
Western States	522,161	995,335	2,522,351
Far Western States	.....	3,200	26,147
Total	2,052,821	3,781,021	9,579,779

No. 10. Aug. 22, 1890. *Quicksilver Mines and Reduction Works.* By T. B. Randall.

This inquiry is one of the new features of the Eleventh Census, as no similar statement was made in the Tenth Census. All of the productive establishments reported upon, both mines and furnaces, are located in California. The world's production for the period 1880–1889 is reported as follows: —

United States, ...	407,675 flasks.
Almaden, Spain, ...	585,939 "
Idria, Austria, ...	133,557 "
Italy, ...	66,440 "
	1,093,611 "

A table also gives the production of the United States by years since 1850, the total being 1,544,844 flasks, valued at $69,258,000.

No. 11. August 23, 1890. *Growth of Rapid Travel Facilities from 1880 to 1889, inclusive, in cities having over 50,000 inhabitants.* By Henry C. Adams. Pp. 8.

This is the first time that street railways have been brought within the scope of the census statistics of transportation. Two hundred and eighty-six street railroads are reported with a total length of 3,151 miles. Table I shows in detail the length of line in fifty-six principal cities in each year 1880–1889, with the increase per cent from 1880 to 1889. A classification is also made as to the various kinds of motive power, a summary of which is as follows: —

	Miles.	Per cent.
Animal power, ...	2351.10	74.62
Electricity, ...	260.36	8.26
Cable, ...	255.87	8.12
Steam, elevated, ...	61.79	1.96
Steam, surface, ...	221.81	7.04
	3150.93	100.00

The length assigned to each of the five leading cities is as follows: Philadelphia, 283.47; Boston, 200.86; Chicago, 184.78; New York, 177.10; Brooklyn, 164.44. This order is explained by the statement that it is a peculiarity of the Philadelphia roads and to some extent of the Boston roads that the tracks usually occupy different streets in going to and from a terminus instead of being laid upon the same street. The result of this is that roads in the cities named traverse a greater length of street in proportion to track lengths than in New York, Brooklyn, and Chicago. This inquiry has been conducted by Mr. Charles H. Cooley.

No. 12. Oct. 30, 1890. *Population of the United States and Territories: 1890.* By Robert P. Porter. Pp. 8.

The population of the United States is reported at 62,480,540, an increase of 24.57 per cent as compared with 1880. During the previous decade the rate of increase was 30.08 per cent. The bulletin is largely taken up with explaining this diminution. It is now estimated by Mr. Porter that the omissions of 1870 amounted to not less than 1,500,000, and that the population of 1870 was at least 40,000.000, instead of 38,558,371. Arguments are advanced to support this view.

No. 13. Oct. 31, 1890. *Production of Steel.* By Dr. William M. Sweet. Pp. 7.

This report covers the year ended June 30, 1890. The following table shows the production of the various kinds of steel in 1880 and 1890. The increase is 290 per cent.

Kinds of Steel. (Ingots or direct castings.)	Tons of 2,000 pounds.	
	Year ended May 31, 1880.	Year ended June 30, 1890.
Bessemer Steel	985,208	3,788,572
Open-hearth Steel	84,302	504,351
Crucible Steel	76,201	85,536
Clapp-Griffiths Steel	.....	83,963
Robert-Bessemer Steel	.....	4,504
Total	1,145,711	4,466,926

No. 14. Nov. 4, 1890. *Financial Condition of Municipalities.* By T. Campbell-Copeland. Pp. 67.

This bulletin treats of the debt, resources, and annual interest charges of 858 municipalities. Comparative tables are given for 1880 and 1890, as well as a summary table for each year of the decade ending in 1890. The increase of the total debt of these 858 towns and cities since 1880 has been $50,455,045, the existing debt being $745,949,786. For this debt towns in Massachusetts, Maryland, New York, and Minnesota are largely responsible. On the other hand, there has been an increase in the sinking funds of $32,022,449.

No. 15. Nov. 7, 1890. *The Census of Alaska.* By Ivan Petroff. Pp. 6.

It appears that the enumeration of Alaska is nearly completed, but the returns have been received only in part, and indeed some from the interior districts cannot be obtained until next spring. The report describes the journeys which Mr. Petroff made and the difficulties encountered in the investigation. The area of the territory covered is estimated at 570,000 square miles.

STATISTICAL REPORT OF INTERSTATE COMMERCE COMMISSION.

Second Annual Report on the Statistics of Railways in the United States to the Interstate Commerce Commission, for the year ending June 30, 1890. Henry C. Adams, Statistician.

In addition to the detailed tables Prof. Adams discusses two subjects of statistical method as applied to railways. The first concerns the classification of railway statistics. Upon this it is remarked that for correct statistical analysis railroads ought to be classified according to the social and industrial conditions which environ them. In arranging for a classification the following principles should be kept in mind: —

First. Some regard should be had to the nature of competition between railways themselves. There is, perhaps, no better indication of the direction in which competition between railways works than the grouping of railways themselves as seen in the various freight and traffic associations that have come spontaneously into existence. It would, then, seem proper, in adopting a rule of classification, to have some regard to the territories covered by the various railway associations.

Second. It would also be desirable to take into consideration the nature of the service rendered by the railways. Under this head it would be necessary to note the density or sparseness of population in the territory through which the railways run, and the nature of the industries that provide freight to be carried. Thus, there are certain roads that are distinctly mineral-carrying roads; others serve wheat-growing districts, cotton-growing districts, and the like. There are some reasons for classifying railway statistics on lines here suggested.

Third. If necessary, further, to have regard to the operating divisions of the railways themselves; for, if statistics are to be worth anything, they should be actual transcripts from the books of the companies making report, and not estimates on the basis of mileage. In a discussion of the question, this third point should perhaps receive less consideration than either of the others, because it is possible for railway companies to adjust their accounts so as to make actual returns for such territorial divisions as the Commission may decide upon. It is being attempted in the Census Office to make a territorial assignment of statistics of operation for each of the ten years ending 1890. Considerable difficulty has been encountered, but on the whole the undertaking promises well. The work there done will be of great assistance to this Office in determining a proper basis of classification.

Attention is called to the incompleteness of railway statistics. It is stated that there are at least four classes of accounts the analysis of which is not provided for, and which are not included in the books of railway corporations. These are (1) the accounts of construction companies, the neglect of which affect most seriously the question of capitalization; (2) accounts of depot companies and those furnishing terminal facilities, as well as bridge companies; (3) accounts of express companies, which are now not open to inspection, and also of those companies which furnish sleeping cars or other cars performing special services, including the co-operative fast freight lines; and (4) accounts of corporations organized as agents for the soliciting of freight, or for the assignment of freight between competing lines.

There is an impression in the minds of the public that part of the legitimate earnings of railway capital is turned aside from the payment of dividends, and applied to the support of various outside corporations. In this manner, it is argued not only is the demand of the public for cheap service estopped by the quotation of false statistics pertaining to the earnings of railways, but the *bona fide* investor in railway stocks is obliged to take less in dividends than the earnings of the business warrant. This claim is either true or not true; but it is to the interest of the stockholder, as well as to that of the public, that the veil of secrecy be taken from the operations of all secondary corporations engaged in a business directly bearing on the transportation of persons and freight.

It is gratifying to note that the Commission is meeting with some success in securing uniformity of railway returns. The recommendation that the fiscal year should end with June 30 has been respected by changes in New York, Massachusetts, Pennsylvania, Connecticut, New Hampshire, and Florida.

An interesting table among the many presented relates to the distribution of employees of different classes, with calculations as to the number in each class per 100 miles of line. The total number of employees per 100 miles is 459. In England the number is 1748.

BANKS AND BANKING.

Garland's Banks, Bankers, and Banking in Canada, to which has been added statistics of the Dominion. Edited by N. Surrey Garland. Ottawa. Mortimer & Co. 1890. Pp. xxiii, 328.

This is the first edition of a work which it is intended shall be issued annually. In its character it is a statistical annual covering not only the field of banking, but general statistics relating to Canada. Of special value is the synopsis of banking systems of the leading countries of the world, which opens the volume. Other features are quotations of highest and lowest prices of the principle Canadian stocks from 1871 to 1889; deposits in savings institutions annually since 1847; the condition of the debt since 1867, with a valuable column showing the rate of interest paid on the gross debt in each year; details of receipts and expenditures of the Dominion government; condition of loan companies and building societies; commercial and railway statistics, etc. Altogether the volume is a very complete statistical handbook.

Annual Report of the Inspector of Finance, showing the condition of the Savings Bank and Trust Companies in Vermont on June 30, 1890. Pp. 223.

The report shows a continued increase of deposits on the part of a state very largely agricultural in its industry. The deposits in 1890 are $19,330,564, an increase during the year of $1,529,236, the largest which has taken place since 1882. The number of depositors is 65,759, of whom 57,918 are residents in the state. Accordingly, about one inhabitant in six throughout the state has a bank account. The inspector discusses in particular the question of investment in western mortgages, the growth of which since 1879 is illustrated by a table. In 1879 such investments were $1,278,399; in 1890, $7,519,470. The subject of taxation of deposits is also considered, and it is stated that "the belief that banks are used to some extent as

depositories for avoiding taxation is not well founded." In one town, Rutland, the system of school savings has been introduced, and in a single year 684 accounts have been opened with a total deposit of $3,529.

How to invest the money deposited is becoming a serious question in Vermont, and recommendations are offered toward a solution. It is advised that savings banks be permitted to invest in railroad securities, which they are now forbidden to do, and that the privilege of investing in municipal bonds of western states be extended to those having a population of 3,000 inhabitants instead of stopping at 5,000, as is now the case.

The Clearing-House System. By Dudley P. Bailey. Reprinted from the *Bankers' Magazine.* Homans Publishing Co. New York. 1890. Pp. 57.

This is an exhaustive statistical survey of the fifty-one clearing-house systems of the United States, with a considerable amount of material relating to other countries. The exhibits are complete not only for the large financial centres, but also for the smaller cities in which clearing houses are established. As far as possible the tables include, from the earliest year of the inauguration of the clearing houses until 1890, the number of banks, clearings, balances, and the percentage of balances to clearings. For foreign countries data are furnished relating to England and her colonies, Paris, Germany, Austria, and Italy. D. R. D.

THE ENGLISH MINT REPORT.

Twentieth Annual Report of the Deputy Master of the Mint, 1889; with a general index to the annual reports from 1870 to 1889 inclusive. London. 1890. Pp. 136, xi.

The part of most general interest in this report is probably the appendix which deals with the restoration of the gold coinage. This report covers a history of the investigations in regard to light coin in circulation, made by Prof. Jevons in 1868, Mr. John B. Martin in 1882, and more lately in 1888 by the mint authorities. The following table gives the different results mentioned: —

Proportion of Coins per 10,000,000 estimated to have fallen below least current weight by wear.

	Sovereigns.	Half-Sovereigns.
Mr. Jevons' estimate (in 1868)	3,150,000	4,700,000
Mr. Martin's estimate (in 1882)	5,470,100	5,392,000
Mint inquiry, 1888 (deduced from mean annual wear)	5,170,000	7,835,000
Mint inquiry, 1888 (ascertained by individual weighing)	4,597,000	7,044,000
Deduced by calculation	5,254,000	7,201,000

The result arrived at by the Mint is a direct one, which does not admit of any error, as each individual coin was passed through one of the automaton balances which separate the coins of legal weight from those which are below it. This last examination justifies the conclusion that the life of a sovereign is somewhat longer and that of a half-sovereign somewhat shorter than Mr. Jevons' figures indicate. On the whole, however, the results of these various inquiries show a remarkable coincidence.

The result of this calculation leads the Mint to estimate that the total value of the deficiency to be made good on the recoinage of light coins is as follows: —

Sovereigns, ... £120,437
Half-sovereigns, ... 114,437

It is also reasoned that the total amount of the sovereigns in circulation at the present time is £80,000,000.

This particular inquiry is illustrated by two diagrams which compare the survivals of sovereigns and half-sovereigns as calculated by the three investigations. The general report is also particularly valuable as containing a résumé of the work of the different departments of the Mint in the past twenty years, and also an index of the previous reports. This index alone will be extremely serviceable to all students of monetary questions. D. R. D.

LOCAL FINANCE AND TAXATION.

In the September–October number of the *Revue d' Economie Politique*, M. A. Achard describes an interesting experiment in municipal administration and finance, undertaken by the city of Geneva. There is a considerable fall in the course of the river Rhone

from Lake Geneva to the confluence of the *Arve*, representing, it is estimated, a motive force of six thousand horse-power; and for many years the municipality of Geneva has supplied water to the city for domestic and industrial purposes, drawing it from the river and distributing it by means of turbines driven by the power of the stream. In 1871 the use of water from the city pipes for motive purposes was permitted, and it was so extensively employed in this way that, three years later, a private company petitioned for the right to utilize the whole power of the river, agreeing to furnish water for the city at its own expense in return for the privilege. The city refused to grant the right, and has since undertaken to collect and distribute the enormous power which had been going to waste within its limits. The plan is to reserve about one-tenth of the power for the domestic water service, and to transmit the other nine-tenths, through a separate system of pipes, by means of water under pressure. The old pipe lines distribute water for the city supply, and for a low-pressure motive power of five atmospheres. The new high pressure system is operated at a pressure of thirteen atmospheres. Eight turbines are now in operation, and it is intended to develop the full power by means of twelve more.

In 1889, 55 different industries made use of this power, by means of 169 motors, representing 550 horse-power. There were 113 motors of an average power of 1.5 horse-power, connected with the old low-pressure system, and 56 motors, averaging 6.8 horse-power driven by the high-pressure service. These motors are used in saw mills, watch factories, and printing offices, but are also employed in driving small machinery, as sewing machines and dentists' drills. The central electric-lighting station is supplied with a force of 629 horse-power in addition. The demand for power is constantly increasing, and during 1890 two new turbines will be put in. The total amount of water distributed in 1889, for domestic, industrial, and motive purposes, for watering streets, and flushing sewers, was 16,400,000 cubic metres, and the receipts from various sources aggregated 569.727 francs. The cost of maintaining this service, including salaries, depreciation, and interest, was 432,594 francs. The city thus obtained a net profit of 137,135 francs.

The low-pressure service is estimated to have cost on the average 2.16 centimes per cubic metre, and the more expensive high service 3.19 centimes per cubic metre. The following table gives the selling

price of water for various uses, and the profit obtained by the city in each case, per cubic metre in centimes: —

	Low-pressure system.		*High-pressure system.*	
	Selling price.	Profit.	Selling price.	Profit.
Domestic use, ...	8.71	+6.55	10.48	+7.29
Industrial use, ...	8.03	+5.87	10 87	+7.68
Motive power, ...	4.23	+2.07	2.09	—1.10

The city derives a profit from the whole system, but it is apparent that the distribution of motive power is much less profitable than the other services, and in one case is operated at a positive loss. This last is in part due to concessions made to the electric lighting company, which are temporary, and which, when the concessions expire, will make the high pressure service less unprofitable, although it will not change a deficit into a surplus for this service.

According to Beringer, a German specialist, the cost of generating by steam one horse-power per hour is

For an engine of	5	horse-power, ...	40	centimes.
" " " "	10	"	27	"
" " " "	50-100	"	10.5	"

and for large power, with greatest economy, 5 centimes.

The charges in Geneva are made upon the monthly consumption; and the tariff for a working year of 3000 hours, for the high pressure system, is

500	francs	per	horse-power,	or	16.67	cent	per	hour	for	1 horse-power.
400	"	"	"	"	13.33	"	"	"	"	5 "
268	"	"	"	"	08.93	"	"	"	"	10 "
173	"	"	"	"	05.77	"	"	"	"	50 "

Although in this case the wear and tear of machinery is not included, as in Beringer's estimate, yet the cheapness of the service is apparent by comparison with his figures. The difference is still more marked if the power be used for twelve or twenty-four hours per day instead of ten, as in the above case; for then the tariff fixed by the city is but one-seventh or one-half greater as the case may be. Allowance is made by the city for discontinuous service, by the system of charging by the total monthly consumption, and as the cost of such service is made much cheaper than it could be with steam-power where expense is largely continuous, whether service be so or not. The following table shows the comparison of the expense for discontinuous service, that is to say for working years of 1500, 1000, 600, or 300 hours, of water-power and steam: —

	Hours.	1500	1000	600	300
Geneva High Service.	1 horse-power	213 francs	142 francs	85 francs	43 francs
	5 "	1004 "	669 "	425 "	213 "
	10 "	1772 "	1260 "	803 "	425 "
Geneva Low Service.	1 horse-power	378 francs	294 "	176 francs	88 "
	5 "	1575 "	1260 "	756 "	378 "
Steam Power.	1 horse-power	900 francs [1]	600 francs [1]	360 francs [1]	180 francs [1]
	5 "	3000 "	2000 "	1200 "	600 "
	10 "	4050 "	2700 "	1620 "	810 "

[1] These figures are calculated on a basis of 60 centimes as the hourly price. No one horse-power engine has been experimented upon.

From these figures it is plain that the city of Geneva furnishes a motive power to its citizens at a very low price, cheaper by far than steam, especially for small powers and discontinuous service. The motor may be easily set up in dwellings or work-shops. There is no danger from explosion, or fire, and no smoke attendant upon its use.

This distribution of motive power by the city obviously differs in principle from the distribution of water for domestic use, it not being necessary to the well being of its citizens.

The writer sums up the conclusions as follows: —

1. "Although motive power cannot be considered as an object of collective necessity, proceeding that is from the gathering of men into communities, it is not contrary to modern ideas that a municipality should utilize and distribute a natural force, when it can be profitably done only when the force is utilized in its entirety."

2. "The service rendered to the community will be greater in proportion as the method adopted for transmission of the force allows it to be subdivided, and made available in all places."

3. "It is conformable to justice, equality, and the general interest that a municipality which has created an institution of this kind should consider it as a fiscal domain, and should draw from it a profit to be applied to its expense account."

WILLIAM Z. RIPLEY.

Report of the Tax Commissioner of the Commonwealth of Massachusetts for the year ending Dec 31, 1889. Pub. Doc. 1890. Pp. 299.

This report does not vary in any respect from former annual issues. Among other tables it contains a list of the names of 2,867 corpora-

tions, subject to taxation, with the date of their organization. Of particular value are the tables relating to the finances of the municipalities of the state. In this the tax commissioner presents material somewhat resembling that published by the Local Government Board of England. There is a statement of the assets and liabilities of all the cities and towns, divided according to the usual departments of local administration, as school houses, water works, etc.; also a statement of the valuation and indebtedness of each town with a percentage of the latter to the former, and the amount of the sinking funds.

The following table gives the aggregate valuation and net debt of municipalities for a period of nineteen years: —

Year.	Aggregate Valuation.	Aggregate Net Debt.	Percentage.
1871	$1,497,351,686	$39,421,298	.026
1872	1,696,599,969	45,221,745	.026
1873	1,763,429,990	53,380,118	.030
1874	1,831,601,165	64,904,069	.035
1875	1,840,792,728	71,784,006	.038
1876	1,769,359,431	72,165,156	.040
1877	1,668,226,792	72,049,685	.043
1878	1,568,988,210	68,864,685	.043
1879	1,529,521,014	67,728,557	.044
1880	1,584,756,802	68,512,927	.043
1881	1,648,239,976	65,408,691	.039
1882	1,684,213,423	62,782,507	.037
1883	1,731,297,061	63,413,128	.036
1884	1,756,879,778	63,595,568	.036
1885	1,782,349,143	63,306,213	.035
1886	1,847,531,422	63,585,220	.034
1887	1,932,548,807	64,675,061	.033
1888	1,992,804,101	65,586,603	.032
1889	2,072,170,872	66,502,030	.032

It should be added that the net debt of Boston alone in 1889 was $27,654,190, or about 41 per cent of the total local indebtedness.

Report of the Special Tax Commission of Maine, appointed under resolve of the Legislature, March 8, 1889. Augusta. 1890. Pp. 192.

Without discussing the final conclusions of the Maine Tax Commission in this place, attention is directed to the considerable amount of information and statistical data in regard to the tax systems of various states which is here collected. The Commission studied not only the laws of all the states, but visited New Hampshire, Vermont,

Massachusetts, Rhode Island, Connecticut, and New York for personal inspection of the working of tax laws. Especially full are the facts in regard to the various listing systems, methods of equalization, poll tax, dog tax, taxation of railroads, savings banks, and insurance companies. Students of taxation will find here several convenient summaries upon these points.

Finance Annual Report of the Executive Department of the City of Boston, for the year 1889–90. Boston. 1890. Pp. 416.

In addition to the detailed tables this report contains summaries of Department expenses for the past decade, and in particular valuable statistics and descriptive material on *Valuation and Taxes of Boston compared with other cities.* There is an interesting table showing the approximate value of the dwelling houses, classified according to their respective values, the classes varying by a thousand dollars, up to $105,000, and more irregularly above that limit. Class three, $2000 to $3000, is the largest, containing nearly one-fifth of the total number of houses, etc. This report can be especially commended for the systematic arrangement of its tables, and for the explanatory notes frequently added to facilitate correct analysis.

Report of the Special Committee on use of Streets by Private Corporations. Boston. City Document 144. Sept. 8, 1890. Pp. 35.

This report is out of the common run of city documents, and should be of considerable value to those interested in municipal economy and administration. It contains information in the form of official communications from a large number of cities, both in the United States and in Europe, stating the service or payments which such street-railway, telephone, or electric-light corporations render for privileges enjoyed in the public streets. These reports cover eighteen American and twelve foreign cities. It supplements in some measure a monograph of the American Economic Association (Vol. II, No. 6) on *The Relation of Modern Municipalities to Quasi Public Works.* The fullest report is from Amsterdam. The committee observe that "Boston is in reality very much behind her sister cities in respect to solving the question of securing a return."

NOTE ON THE STATISTICS OF CRIME.

As it may be expected that the results of the Eleventh Census will show a large increase in the amount of crime, the means of studying the facts assume a great deal of importance; it seems proper, therefore, to direct the attention of the Statistical Association to some efforts on foot for obtaining better statistics.

During the last session of Congress a bill was favorably reported by the committee of both Houses for the establishment of a Prison Bureau in connection with the national government. Such a bureau would be similar in its scope to the Bureaus of Labor and Education. One of its chief duties would be the collection of statistics. Its organs would reach into the courts and count the persons accused and convicted of crime, and they would go into the prisons and count the persons serving out their sentences. Its prime object would be the collection of facts. If established, there can be no doubt that we would be able to approach the study of the delinquent classes with greater intelligence and larger prospect of solving at least a few elementary problems. It is to be hoped that the active efforts of Mr. E. C. Foster, general agent of the Department of Justice, the father of the bill, will be successful in securing its passage.

The prison wardens of the United States have an organization of their own for the consideration of practical topics of prison management and for securing uniformity of action along certain lines of policy. The subject of statistics is one of those which they have considered at several meetings. At the request of the secretary of that organization it was the privilege of the writer to present the subject at their recent meeting in Cincinnati in connection with the National Prison Association. A plan of operations was submitted whereby it was believed that accurate statistics of penitentiaries could be collected annually at trifling expense and labor and with excellent results. The plan proposed was that each state institution for adult offenders should fill out blanks for the personal characteristics of each prisoner received during the calendar year, and send these blanks to the secretary of the organization for the compilation of the figures. The results should then be published in a volume to be entitled the "Annual Statistics of Prisoners," the date being given for the various institutions, with the most numerous combinations, and to be accom-

panied by a carefully prepared explanatory text. It might be mentioned that the blanks to be used in this scheme are individual cards, and not lists. It is my pleasure to inform the Statistical Association that the plan there proposed was approved by the organization. Preparations are now being made to carry it into effect. It will be applied to the year 1890, and it is the hope of those who have the matter in charge that the participation in the effort will be general, thus securing from the beginning valuable results.

It is impossible to foretell which of these plans will be most successful. It is important to note that success means opportunities for study which have hitherto been closed to us. The success of either of these plans will be a step towards placing our country on a level with European nations in this respect. Important practical and theoretical problems hinge on the phenomena of crime, and we should have more adequate means of studying them.

ROLAND P. FALKNER.

PRICE STATISTICS.

The latest contribution to the subject of price statistics is an article by Soetbeer in Conrad's *Jahrbücher für Nationalökonomie und Statistik*, Vol. xxi, No. 4, p. 412, entitled: "*Veranderungen im Niveau der allgemeinen Warenpreise im den Jahren 1881–1889.*"

The author first reviews the several attempts which have been made to obtain reliable statistics concerning the fluctuation of prices in the last fifteen years. For this purpose, so-called index-numbers have been used, or percentages of combined averages. Various objections have been raised against this method. It is arbitrary and incomplete, and therefore yields unreliable results. But its chief faults are that the number of articles taken into account is too limited, and that the marked difference in the quantitative economic importance of the goods is either entirely overlooked or reduced to an inappreciable unit.

Most of these deficiencies are avoided by another method to which Soetbeer calls attention, although a considerable margin of errors is still left. It is based on the government valuations of international exchanges, which are observed with increasing interest and exactitude.

The German statistics begin to present appropriate material in 1881, after the statute of July 20, 1879, provided the necessary regulations regarding the declaration of quality and quantity of the goods imported, exported, and transported, and the average prices to be applied in the valuations. This system of the empire differs from that of England and the United States in so far as it does not call for self-declaration of values, but has valuations determined by official experts. The Board of Experts, appointed by the Statistical Bureau, is divided into sections, to each of which certain groups of goods are assigned. In preparing the statistics of last year thirty-nine experts were employed, who estimated the average prices of 933 articles.

They proceed in the following way: Certain groups of products belonging to the same kind are formed. The articles contained in these groups are considered in all their commercial relations, especially in the quantitative relations of the principal qualities in import and export. After having found the average prices of the several articles of which one group is composed, this average price of the group is computed. The import duties and export premiums are not taken into account. The valuations are made for the calendar year. To be of use they must be procured continuously from similar material and according to the same method. They enable us to compare the values of imports and exports for certain periods, but they do not help us in estimating the annual fluctuations in a certain country, since the imports and exports do not equal the production and consumption of such a country.

The fluctuation in prices for the period 1882 to 1889 as compared with the average prices of 1881 is computed as follows: —

	According to Imports.	According to Exports.	Average.
1881	100.0	100.0	100.0
1882	99.8	100.7	100.3
1883	98.2	98.5	98 4
1884	93.3	92.8	93.1
1885	85.8	85.8	85.8
1886	85.4	83.8	84.6
1887	85.5	83.5	84.5
1888	85.4	84.7	85.0
1889	88.6	87.2	87.9

The prices of articles in German foreign trade have thus been decreasing in the years 1883–87, especially so in 1884 and 1885,

although only gradually in 1886 and 1887, while they show a slight increase in 1888 and 1889. But in spite of this increase the average in 1889 is twelve per cent less than that in 1881.

Generally, from such fluctuations the value of money or the purchase power of gold is inferred. Such inferences are correct with regard to the purchase power of gold in wholesale trade, but not to the purchase power of gold in general, since there are other exchanges in which money is used as measure of value and means of payment. From the fact that prices have fallen twenty per cent since 1875, we are not justified in concluding that the means of existence have grown cheaper. On the contrary, the complaints are general that they have become more expensive, and this proves that the value of money has decreased. In retail trade, prices have by no means experienced the same reduction as in wholesale trade, while, on the other hand, higher wages, salaries, fees, are now demanded for all kinds of personal services. The house-rents in large cities are higher, and many other things are more expensive. All this indicates a decrease in the value of money.

Soetbeer, however, does not agree with the bimetallists who maintain that the demoralization of silver has caused the fall in prices. He gives the following comparisons: The level of prices of 1885 and 1888 remained almost stationary, and from 14.2 to 15 per cent below that of 1881 and 1882, while the average price of silver in 1885 and 1888 fell from $48\frac{5}{8}$ to $42\frac{7}{8}$ pence. In 1889 the level of general prices rose about 3.4 per cent above that of 1888, but the average price of silver was lower than in 1888. In consequence of the new silver policy of the United States, the debates preceding it in Congress, and the speculation connected with it, the price of silver rose from 44 pence at the end of 1889 to 54 pence in September, 1890; but it does not seem probable that the prices of merchandise will follow this rise in the price of silver. L. KATZENSTEIN.

In Weeden's *Economic and Social History of New England* (Boston, 1890), there is an appendix giving a table of prices from 1630 to 1789. The prices for leading staples of domestic production and rates of laborers' wages are stated with great regularity. The list will supplement that given in the *Report of the Massachusetts Bureau of Statistics of Labor* for 1885, the prices in the latter, however, not going back of 1785. For practical use, Mr. Weeden's list needs

explanation. The necessity of an intelligible interpretation of colonial prices is emphasized when a comparison is made between the two lists of prices mentioned above for the period when they overlap, 1758 to 1789. The discrepancies are so wide that a student would have to be very cautious in using either set.

In the *Banker's Magazine*, November, 1890, p. 333, is an article on *Relative Prices of Silver and Wheat*, by H. A. Pierce, in which a statistical table is presented, showing the production and exports of wheat and flour, and the prices of wheat and silver since 1873. The argument from the figures submitted is that low prices of wheat have been due not to larger production, but to the decline in the value of silver. The table is well prepared, and is suggestive in its presentation.

PROBLEMS OF POPULATION.

Marriage Rates and Marriage Ages, with special reference to the growth of population. By Dr. William Ogle. In *Journal of the Royal Statistical Society* (London), June, 1890. Pp. 253–289.

The author advances the theory that there is an intimate relation between the marriage rate in England and the value of exports. In discussing the possible effects which wars or high price of wheat might have upon a disposition to marriage, he finds the first insignificant in England, and any actual effect of the second is denied. Contrary to a general belief, it is asserted that the marriage rate varies not inversely but rather directly with the price of wheat. A truer index is found in the value of exports which in turn may be taken as an indication of industrial activity. In the period 1839–88 there are only five years in which the marriage rate moved in a different direction from the export value. The graphic curves illustrating this are very striking. A comparison is also made between the marriage rate and the proportion of unemployed in certain trade unions, as given in recent labor statistics of the Board of Trade, and here again the correspondence in the respective fluctuations is very close. Even in the Glass Bottle Makers of Yorkshire United Trade Protection Society, with a small membership of 1600, it is found that "the fluctuations in the employment of this minute body of men correspond

closely in their directions with the fluctuations in the marriage rate of the entire country." Further analysis shows that marriages are more numerous in England in those countries where women are earning independent wages.

The concluding portion of the paper is devoted to a consideration of the various causes which might bring about a stationary population, for Dr. Ogle thinks that the present rate of increase will shortly reach "its permissible limits." His judgment is that "it is manifest that if the growth of population is hereafter to be arrested, and a stationary condition produced, either by emigration, or by increase of permanent celibacy, or by retardation of marriage, these remedies will have to be applied on a scale so enormously in excess of any experience as to amount to a social revolution."

The movement of the population in France in 1889 has not been so uniform in its elements as in preceding years. Births have been more numerous than was anticipated in view of the regularly falling returns of previous years. The births in 1889 were 880,570 against 882,639 in 1888, that is, a decrease of only 2,060. In 1888, however, the loss was 16,794 as compared with 1887. At the same time there has been a smaller number of deaths, 794,933 in 1889 as compared with 837,867 in 1888. The result of this has been to make a net addition to the population of 40,874, a gain which has not been noted since 1885. The marriage rate, however, fell in 1889, a fact which does not augur well for the future. The numbers of marriages was 272,984, or 3,914 less than in 1888. The proportion of marriages was only 7 per 1,000 of the population.

Attention is here called to extracts of an article on *French and English Mortality* published in the "Miscellany."

At the annual meeting of the British Association for the advancement of Science, held in September at Leeds, a striking address was made by Mr. E. G. Ravenstein, upon the question of the lands of the globe still available for European settlement. Mr. Ravenstein estimates the present population of the world at 1,468,000,000 with an increase of 8 per cent every 10 years. To fertile or comparatively fertile land he assigned 28,000,000 square miles; to bare grass lands, or steppe, 14,000,000; and to bare desert, 4,180,000. For the bare desert land he allowed a possible population of 1 to the square mile; to

the poor grass land, 10; while to the fertile area he regarded 207 to the square mile as a moderate estimate. This last ratio is based upon the known density of population in such countries as China, Japan, and India. The earth, upon this calculation, could sustain 5,994,000,000 people; and if the population continued to increase at the rate of 8 per cent per decade, that maximum would be reached in 182 years. In commenting upon this address the London *Economist*, September 13, expresses the opinion that this is an underestimate, the possibilities of agricultural production not being taken into account.

A full, if not verbatim, report of Dr. John S. Billings' *Lectures on Vital and Medical Statistics*, delivered as the Cartwright Lectures before the Alumni Association of the College of Physicians and Surgeons, New York, in 1889, was published in the *Medical Record* of November 30, December 7 and 14, 1889. The lectures are illustrated by diagrams.

Twenty-first Annual Report of the State Board of Health of Massachusetts. Boston. 1890. Pp. 457.

Two special reports in this volume are of general interest, *The Physique of Women in Massachusetts*, by Dr. H. P. Bowditch, pp. 285–304; and *The Influenza Epidemic of 1889–90*, by Dr. Samuel W. Abbott, pp. 385–442. Dr. Bowditch in earlier reports has contributed two articles upon the *Growth of Children*, based upon the study of some 24,500 measurements of pupils of the Boston public schools. The present article is an attempt to obtain a fairly correct idea of the physical type of the adult young woman in the vicinity of Massachusetts, based upon a set of 1107 observations. The tables refer to the height, weight, sitting height, and stretch of arm of the women observed; and the returns are compared in some instances with similar observations made by Dr. Sargent and Mr. Galton. Dr. Bowditch has also made use of the statistical methods used by Mr. Galton, described in *Natural Inheritance*.

In the paper by Dr. Abbott a complete history of the epidemic is given, and as a result of special investigation made at the time some interesting conclusions are arrived at. The ratio of the population in Massachusetts attacked was about 40 per cent, or about 850,000 persons. The ratio of persons in industrial establishments who were obliged to leave their work on account of illness was about 27 per

cent of the whole number employed, so that it is computed the loss to the state amounted to several million dollars. The ratio of deaths to those attacked was 31 per 10,000. Several charts are added comparing by curves the death rate in a large number of European cities during the epidemic period. DAVIS R. DEWEY.

MINOR NOTICES.

A Preliminary report on the cost of production. Pig iron, steel ingots, steel rails, coal, coke, iron ore, and limestone. By the Commissioner of Labor. Washington. 1890. Pp. 61.

For some time it has been known that the Department of Labor, under the direction of Hon. Carroll D. Wright, was at work collecting data in regard to the cost of producing certain staple commercial products in this country and in Europe. Besides the industries referred to in the above title the investigation will include the cotton and wool, glass, linen, silk, and earthenware industries. The information when published will exhibit an analysis of materials used, taken from the books of the establishments; the efficiency of labor or the proportionate cost of labor to the whole as determined from pay-rolls; and finally the cost of living. The full report will be published in three or four volumes. It speaks well for the high standing of this Department in Europe "that a sufficient number of manufacturers have been found in different countries who were willing for the purposes of science to furnish the information desired."

This preliminary report embraces data from 412 establishments. In arriving at the cost of production "only those elements of cost which are universal, positive and absolutely essential" are included. For this reason, interest, insurance, depreciation of the value of plant and charge for freight of product to place of free delivery have been excluded. The elements of cost taken, include materials, labor, payments to officials and clerks, supplies and repairs, and taxes.

The value of this report when complete can hardly be overestimated; and to the careful investigator this preliminary report will throw light upon many disputed industrial questions involving statistical analysis. D. R. D.

Some Experiments on behalf of the Unemployed. By Amos G. Warner, Ph.D. In *Quarterly Journal of Economics.* October, 1890.

Contains four statistical tables compiled or translated from German sources. The subjects are: 1. Statistics of the German laborers' colonies, with age, marital state and religion, and industrial standing of the inmates. 2. Length of stay and balance of earnings due at departure of all ex-colonists at certain colonies. 3. Length of stay and cause of departure of all leaving sixteen colonies, 1886–87. 4. Persons convicted of crimes or misdemeanors in fourteen colonies, 1886–87. The whole article is in line with Dr. Warner's previous statistical studies of the subject of pauperism.

Number 17 of the supplements of Conrad's *Jahrbücher für Nationalökonomie und Statistik*, pp. 60 (Jena, 1890), is devoted to a review of Life Insurance in Germany for 1889. An annual review of this nature has been published for some forty years, though only since 1884 in Conrad's *Jahrbücher.* The general plan and scope of the statistical tables has been uniform from the beginning; and the work has long been regarded as authoritative and valuable to the insurance profession. The tables are very complete, affording a picture of the development of life insurance since 1829.

It is, perhaps, not too late to direct attention to an important tabulation published in the *Spectator* (New York), Oct 10, 1889, prepared by Mr. Walter C. Wright, showing the death rate based on 9,029,408 yearly exposures for a maximum period of 64 years, as determined by seven different enumerations of mortality experience. The table exhibits in detail the number of lives exposed, the number of deaths, and the death rate of each year of assurance.

The thirty-ninth issue, 1890, of *Otto Hübner's Statistische Tabel*, now published by Dr. Fr. von Juraschek, continues the previous tabulations with suitable revisions to bring it down to date.

The Massachusetts Bureau of Statistics of Labor, under date of Oct. 1, 1890, has issued a second circular letter, announcing the Publications, now in print, which the Bureau will be glad to distribute to applicants upon payment of postage. It is stated that the Bureau library contains 7500 books or pamphlets devoted to statistical subjects.

In the *Annual Report of the Chief Signal Officer of the Army, for the year 1890* (Washington, 1890, pp. 36), it is announced that the percentages of successful forecasts during the past fiscal year were 84.4 for weather, 78.7 for temperature, and 82.6 as a general average. This is an increase in accuracy of 1.7 per cent over 1889. During the year 1,112 storm signals were ordered, of which 1,040 were justified as to direction; 695 justified wholly as to velocity, and 59 partly as to velocity. Long time forecasts of weather and temperature were issued at the discretion of the forecast official with a successful percentage of 81.6 for 48 hours, and 80.5 for 72 hours. For 48 hours 1,833 predictions were made; and for 72 hours, 146. It appears that 98 per cent of all the important cold waves were predicted. A special paper on tornadoes is announced to appear in the full report, and the remarks of the chief signal officer in regard to securing a unit of comparison for tornado damage are of general statistical interest. The officer in charge of this investigation, Mr. Hazen, divided tornadoes into three classes: (1) violent storms causing destruction; (3) the most severe tornadoes, and (2) all other known violent storms. In classes 1 and 2 there were about 1,000 tornadoes each, for the total period covered, which caused the death of 1,071 people, or an average of one person to two storms, and a financial loss of about $23,000,000. In class 3 there were 58 tornadoes, killing 755 people and destroying about $12,000,000 of property.

"It is well settled that in the last eighteen years the annual death casualties from tornadoes average 102 annually. While this is a large number, yet it does not appear to be as great as the death casualty from lightning, since, during the present year from March to August, inclusive, there were 102 lives lost by lightning, and in compiling this record the list is incomplete, especially as regards the Southern States."

MISCELLANY.

FRENCH AND ENGLISH MORTALITY.

The following paragraphs are taken from an article published in *London Times* (weekly edition), Sept. 26, 1890.

"In the first place, if sanitary conditions were equal, France ought to have a considerably lower death-rate than England, since its birth-rate is about only 23 per 1,000 of population against our own 31, and consequently there are less children of an age when the mortality is greatest. But, on the contrary, the death-rate for France during the five years 1884–88 was 22.3 per thousand, while that for England was under 19. The difference between these figures is really tremendous, for it means, in effect, that in a given population there are seven deaths in France for six in England. And if we proceed to analyse the cause of the higher mortality, it is pretty plain that it is due to imperfect sanitation. Unluckily, the French registration system is very defective, and there are no means of ascertaining with accuracy the number of deaths occurring throughout the country from particular diseases. As regards fever, for instance, the mortality cannot be precisely stated; but an official report addressed to the Comité d'Hygiène a couple of years ago estimated that it caused about 21,350 deaths annually, or about 600 per million of population. In England and Wales the yearly deaths from it are about 5,000, or 170 per million. Roughly calculated, therefore, there is about three times as much fever in France as in England. But although no detailed statistics as to the whole country are obtainable, the Bureau de l'Hygiène has of late years published a classified return of mortality in such towns of France as have a population over 10.000, and this return tells a tale. It will be convenient, in the first place, to compare the figures for Paris with those relating to London. These two are, according to Professor Marshall's "Economics," the two largest manufacturing towns in the world, and their inhabitants have many conditions in common. In the five years ending with 1889 the general death-rate of Paris was 23.5. That of London was 19.0. This difference is startling, but an analysis of the causes of death brings out still more striking results. It may be said without hesitation

that the two diseases which are most directly influenced by sanitary conditions are enteric (typhoid) fever and diarrhœa. It is only where water is polluted, where sewerage is defective, or where earth and air are fouled by accumulations of filth, that these diseases flourish. In the same five years the average annual number of deaths from enteric fever in Paris was 1,072. In London, with almost exactly twice the population, the number was 612. In other words, in a given population there was between three and four times as much fever in Paris as in London. As regards diarrhœal diseases, the deaths in Paris averaged 4,126, those in London, 3,167, the Paris mortality from this cause being proportionately nearly three times that of London. The reasons are not far to seek. In London, though there are plenty of shortcomings in the sanitary administration of particular districts, we have the advantage of possessing an efficient system of sewerage and water, which if it does not attain a standard of ideal purity, nevertheless passes the most exacting tests which analysis can apply. In Paris, not only are a good many of the sewers badly made and insufficiently ventilated, but (unless alteration has been recently made) some thousands of houses still drain into cesspools (*puisards*), and filth thus accumulates for months in the midst of a crowded population.

"But if the sanitary condition of the capital leaves much to be desired, that of many of the provincial towns is far worse; and in some of them the number of deaths from preventable diseases is really appalling. It is worth while to examine the last statistical return published, which is that for 1888, bearing in mind, by the way, that the year in question had, with one exception, the lowest mortality of the last quarter of a century. It may be noted for comparison that the general death-rate in 1888 of the 28 largest towns in England was 19.2, the highest being Manchester (26.1). In the 29 largest provincial towns of France the average general death-rate was 25.4. Marseilles had a general death-rate of nearly 29, Havre of 35½, Rouen of 33½, Montpellier of 33, Brest of 32, Dieppe of 32, Reims of 31, and so on. Among the smaller towns there are higher figures still. Ivry, for instance, near Paris, had a death-rate of 43; Lambézellec, a town of some 16,000 inhabitants not far from Brest, had the same damnatory figure; so had its neighbor Morlaix; while Douarnenez, with a population of 11,000, also in the Finistère, actually reckons a mortality of 53 per 1,000. In English towns, among each

10,000 of the population, two persons died in 1888 of fever, and six of diarrhœa. The corresponding rates in the 29 largest provincial towns of France averaged 6 and 23 respectively, or three times as much fever and nearly four times as much diarrhœa as in England. In Marseilles they were 10 and 30 respectively, in Havre 26 and 30, in Lorient 28 and 4, in Rouen 8 and 74, in Cherbourg 24 and 19, and in Brest 11 and 20.

MULHALL ON STATISTICAL COMPUTATIONS.

In an article on *The Study of Statistics*, published in the *Contemporary Review*, October, 1890, Mr. Michael G. Mulhall finally throws light upon some of his statistical methods which have long puzzled students endeavoring to authenticate his conclusions. He devotes one section to what he terms Speculative Statistics in the following manner: —

"These come under Jevons' definition, 'occupying the debatable ground between ascertained fact and reasonable conjecture.' According to the official school they are not statistics at all, but guesses, more or less accurate, and of no scientific value whatever.

"Nevertheless, they constitute a very high order of statistics, and are by no means of that vague and uncertain character which opponents insinuate. Let us give a few illustrations. Some one inquires: 'What are the numbers of Anglicans, Roman Catholics, etc., in England?' The official statist replies: 'It is not known, because the census takes no cognizance of creeds.' But I answer: 'We know perfectly well, for the Registrar-General's returns shows that 72 per cent of the marriages are performed in the Church of England, 4 per cent in Catholic Churches, and 24 per cent among Dissenters.' Somebody else asks: 'What is the consumption of eggs in the United Kingdom?' The official statist replies: 'We can tell you the number imported, but not the home production.' And I answer: 'We have 20 million hens, which lay usually 90 eggs each per annum, from which, deducting 10 for hatching, we have 1600 millions home product, and 1100 millions imported last year: in all, about 2700 millions, or 73 per inhabitant.' A third person asks: 'What is the consumption of meat in the United Kingdom yearly?' The official statist replies: 'Unscrupulous persons may make a guess, but we

really don't know.' I reply: 'The consumption can be ascertained to 1 lb. per inhabitant, by the scale already given in my observations on food-supply.' A fourth inquires: 'What is the value of shipping and merchandise lost yearly at sea?' The official statist says: 'Heaven only knows.' And I reply as follows: 'The insurance agencies charge $1\frac{1}{4}$ to $2\frac{1}{2}$ per cent; hence, the losses must average about 1 per cent. The shipping in 1883 was 21,600,000 tons, and the merchandise carried over sea 153,000,000 tons. The loss was therefore: —

216,000 tons	shipping, value	£2,400,000
1,520,000 "	merchandise	27,400,000
	Total	£29,800,000'

The value of merchandise was £18 per ton, since that was the average in 1883 obtained by dividing the imports of all nations by the tonnage of entries. A fifth asks: 'What is the value of British manufactures?' To which the official statist replies: 'You might as well ask how many gallons of water are in the Atlantic Ocean.' And I reply in the way already shown, treating of manufacturing statistics, in which the hardware manufactures appear to reach 154 millions sterling per annum, and textiles by multiplying the value of fibre by two and a half. A sixth inquires: 'What are the annual earnings of the British nation?' And the official statist replies: 'These are matters beyond the reach of mortal ken, unknown even to experts such as we.' And I reply briefly as follows: 'The earnings are easily ascertained by summing up the following: —

1. The rent of houses and lands, or rental valuation.
2. The value of food consumed in the year.
3. The value of cotton, woollen, linen, etc., goods consumed.
4. The cost of fuel, gas, and kerosene.
5. The amount paid for transport, say double the railway earnings.
6. The sums expended in national and local taxes.
7. Three per cent on the above gross sum, for learned professions.
8. The annual accumulation of wealth.

These make up 1260 millions sterling.'

"A ninth person asks: 'What is the wealth of the United Kingdom, France, and the United States?' The official statist replies as before: 'There are some things forbidden for man to weigh or estimate, and this is one.' And I answer: 'Public wealth consists of

ten items, all of which can be measured to a nicety, except one, the value of public works. Land, for example, is worth thirty times the assessed annual rental valuation. Houses are worth eighteen times the rental. Furniture (according to insurance agents) is always worth half the value of the house. Cattle, railways, and shipping offer no difficulty. Merchandise may be taken at six months' imports and exports; and as for public buildings and works, we find churches cost £10,000 each, schools £1000, and high-roads £500 per mile.' The values thus summed up show: —

United States, ...	13,600	millions sterling.
United Kingdom, ...	9.600	"
France, ...	9,100	"

MORTALITY VS. IMMORTALITY.

In an article with the above heading the *Boston Medical and Surgical Journal* justly criticises certain current methods of statistical reasoning. Parts of the article are given below.

"The Supervising Surgeon-General of the United States Marine Hospital Service in a recent weekly abstract of sanitary reports presents the following refreshing bit of information in the shape of a quotation from the *Monthly Bulletin of the State Board of Health of Iowa*, for June, 1870.

'In 1880 the annual death-rate of Iowa was 16 per 1,000 of the living population. In 1885, with an increase of population of 225,297, the annual death-rate was 4.5 per 1,000 of the population. In 1890, with an estimated population of 2,193,477, an increase of 340,564, the annual death-rate is estimated at a fraction over 4 per 1,000. In 1883 it was only 3.7 per 1,000 of the population.

'The records show that fully 70 per cent of the total deaths in 1880–81–82 were caused by contagious, and therefore preventable, diseases. It was not till 1883 that the work of the State Board of Health began to be realized. The saving of lives, therefore, through the sanitary and protective measures of the State Board is a record to be proud of. It is a record worthy the consideration of every thoughtful mind.'

"In the original report, from which the above statement is quoted, the following data are also printed: —

Cities.	Total deaths.	Population.	Death-rates.
Burlington,	352	30,000	11.66
Clinton,	228	17,000	1.30
Council Bluffs,	229	35,000	0.06
Cedar Rapids,	273	16,000	1.70
Davenport,	438	33,715	12.09
Des Moines,	438	58,000	0.75
Dubuque,	327	35 000	9.28
Keokuk,	192	13,151	12.00
Mt. Pleasant,	65	1,500	4.50
Ottumwa,	169	16,000	0.94

"The foregoing statistics are worthy of the genius of a Squeers. The conventional mode of expressing a death-rate is as a ratio per one thousand of the living population. The go-as-you-please method of the Iowa Board of Health can hardly be recommended for general adoption. Mortality is the common lot of all mankind, and it is quite plain that there is such a condition as a healthy, or, to use a better term, normal standard as a mortality-rate for a given community or population. By this is not meant the mortality-rate of selected classes."

"The mortality of city populations, large and small, in the United States, may be stated, with few exceptions, as from eighteen per thousand upwards; and for rural populations in well-settled districts as from eleven per thousand and upwards. But when such figures as 3.07 per thousand for a single year for a population of about two millions are quoted, it is time to call for a recount of ballots, and to inquire what are the sources from which such an estimate is made. It is not strange that such claims are made by a Western state; but when the head of a department which assumes to itself much of the sanitary care of the nation, and is supposed to be an authority in vital statistics, publishes such data seriously as a contribution to the vital statistics of the country, we would respectfully call them in question."

REVENUE STATISTICS OF ENGLAND.

In an article on *The Half-Year's Revenue*, the *London Economist*, Oct. 4, 1890, comments upon the unsatisfactory form and the indefiniteness of the Revenue statistics as presented by the Treasury. Readers of *Statistics of Municipal Finance*, by Dr. H. B. Gardner,

and of *Finance Statistics of the American Commonwealths*, by Prof. E. R. A. Seligmann, will be especially interested in the criticism.

"A false impression has been created by a mixing up of Imperial and local funds, which renders the Treasury return so indefinite and misleading that it is really impossible to ascertain from it how matters actually stand.

"One word must be added as to the form in which the returns are rendered. That has been improved lately, but that it stands in need of still further improvement is sufficiently obvious from the fact that all the process of analysis through which we have gone is necessary in order to arrive at an approximation to the true facts, and that not even by the most careful analysis is it possible to ascertain exactly what portion of the total receipts constitutes Imperial revenue, and which portion belongs to the local authorities. And, in passing, it must be said that this is only one of the complications that Mr. Goschen has introduced into our system of account. What with special funds of one kind and another,— defence funds, local finance funds, etc.,— the accounts have been so muddled up that we feel confident not one member of the House of Commons out of a hundred could, if called upon, say exactly how our finances stand. And where there is this ignorance, how can there be efficient financial control? Complete and easily intelligible accounts are the *sine qua non*, if we are to have efficient Parliamentary supervision, and one of the first reforms to be effected should be the separation of the local revenues from the Imperial. It is true the present system of passing the local funds through the Treasury gives the Chancellor of the Exchequer the temporary use of money which belongs to other authorities; but what he gains they lose, and if there is profit to be made by the use of the funds allocated to local purposes, it is the local authorities and not the Imperial Exchequer that these profits should go to."

VITAL STATISTICS OF TRINIDAD, B. W. I.

In a paper entitled *Our Population: A review of the vital statistics of Trinidad, B. W. I.* (June, 1890, pp. 28), the author, Henry James Clark, the Government Statist, arrives at the following general con-

clusions, which are of interest as indicating a phase of the population problem, often referred to in colonial reports.

"It seems only natural to assume that it would be wiser to increase our stock of labor by preserving the infant life among our own people than to rely for that increase upon an expensive system of imported labor. and that, therefore, even from this low point of view the excessive infant mortality revealed in the facts and figures of this article calls loudly for some effort to check its increasing proportions, so as at least to minimize the number of deaths from *preventable* causes. The marked success of the Gordon Ward, and its already wide popularity, point strongly to the establishment of Day-homes, or *Crèches*, where, for a nominal consideration, children could be kept and tended during the absence of the mothers at work, as likely to be of incalculable benefit in saving infant life."

"That seeing an increase in the proportion of women to be introduced among our East Indian immigrants would displeey lead to a large increase in the birth-rate of that class of our population, such increased proportion, even if attended by increased expenditure, becomes from the standpoint of population a simple question of present or deferred expenditure, while the many other self-evident advantages that would accrue from it seem, to the writer, largely to outweigh any monetary consideration that might be urged against it."

"That, leaving aside all higher considerations, and looking solely to their effect in checking the natural increase of our population, the two great blots on the social and moral life of the colony, concubinage and illegitimacy, deserve far more attention than they have hitherto received."

"That the large proportion which our hospital deaths bears to our total deaths, and the equally large proportion among those deaths occurring soon after admission, point clearly to a certain amount of preventable *adult* mortality, and to the urgent need of some reform in our present system of out-door relief and medical attendance on the sick poor. In this connection the writer is of opinion that every encouragement should be given to Friendly Societies (of which several have recently been started), one of whose main objects is to secure for members and their families, when ill, better and more regular medical care and attendance."

THE ENGLISH CENSUS.

The report of the committee appointed by the Treasury to inquire into certain questions connected with the taking of the English census includes among its recommendations the following: —

"(*a*) that the number of the population, and its distribution as regards age and sex, be ascertained midway between the decennial periods at which a full census is taken;

"(*c*) that if the enumeration be taken more frequently than hitherto a small permanent census branch of the department of the Registrar-General be established in England, if not also in Scotland and Ireland;

"(*d*) that, except to the extent to which second division clerks may be employed under the conditions which have been proposed by the Registrar-General for England, the census clerks selected for employment under that officer be chosen by open competition within suitable limits of age;

"(*e*) that the special attention of superintendent registrars and registrars be called to the importance of a very careful selection of enumerators;

"(*f*) that, in addition to the information hitherto obtained, columns be added to the householders' schedule for enabling persons to be returned either as employers, employed, or neither employers nor employed, the propriety of publishing such returns to be a matter for subsequent determination;

"(*g*) that the term 'rank' be omitted from the column hitherto provided for 'rank, profession, or occupation';

"(*h*) that persons following no occupation, but deriving an income from property and other sources of a permanent character, be so returned, and that they be separately tabulated in the published reports;

"(*i*) that provision be made at the foot of the householders' schedule for a statement as to whether the number of rooms occupied is less than five, the actual number in that case to be given, the publication of the results to be afterwards decided as under (*f*)."

TABULAR STANDARD OF VALUE.

At the recent September meeting of the British Association the following proposal for an official index number to serve as a tabular

standard of value was submitted by a committee appointed for that purpose.

"(1) A special commission to be appointed to collect prices of such principal articles of production and consumption as may, from time to time, be directed by Order in Council.

"(2) The commission is to appoint inspectors of prices in towns, and to direct by Order in Council that persons buying and selling in these towns, &c., are to make returns in the prescribed form to the inspector.

"(3) Persons failing to make a return, or making a false return, are to be liable to a penalty of £20 on conviction.

"(4) The commission shall publish, from time to time, in the *Gazette*, in the prescribed form, the prices so obtained.

"(5) The commission shall also publish a statement of the average prices of each of the specified articles for the ten years immediately preceding and for each of these years; and the prices so declared shall be taken to be the par prices for the purpose of this Act.

"(6) In January the commission shall publish the prices for the previous year; and a table of the proportion of these prices to the par prices, each of the par prices being reckoned for this purpose as 100, and the proportion in each case being stated in the form of the proportion to 100. The sum of these proportions shall also be stated. The table may be divided into parts, and the sum of the proportions in each part stated separately. The sum of the par prices, each reckoned as 100, shall be called the par index-number, and the proportionate index-number for each year: and the sum of the par prices for each part, and of the proportions in each year, shall be called the par index-number, and the proportionate index-number for each part.

"(7) It shall be lawful in all contracts for payments in money to express that the payment is to be made for a given year in the proportionate index-number for that year, either for the whole of the said table or for a part of it, and thereupon payment may be made in such sum of sterling money as will correspond in respect of the sum contracted to be paid to the proportion which the proportionate index-number bears to the par index-number.

"(8) Unless where stipulated to the contrary, all pensions, annuities, and salaries receivable and payable by the government, and which may be fixed after the passing of this Act, shall be paid in the proportionate index-number.

"(9) New articles may be introduced into the list and the table, from time to time, by Order in Council."

CHARITY STATISTICS.

In the *Report of the Committee on Charity Organization*, Mr. Nathaniel S. Rossman, chairman, made at the Seventeenth Conference of Charities and Corrections, May, 1890, criticism is made of the unsatisfactory results obtained in connection with the preparation of the statistical portions of the report. The Report continues as follows: —

"At the Conference of Charities in Buffalo, the representatives of the various societies adopted a blank for the collection of statistics, which was designed to be used by all the societies in the country. Twenty-eight societies agreed to use these blanks, but only eight appear to have lived up to their agreement. With this small result in hand, it is not worth while to attempt any investigation either as to the work of charity organization in general, as to the causes of pauperism, or as to the direct results of charity work. There is a decided need for reliable statistics with regard to the poor and pauperism, and there is no better vehicle for conveying such information than a charity organization society. All of the societies are at work trying to reduce pauperism, and all are succeeding in a measure. But nobody has yet been able to lay down a general rule for work; nobody has yet been able to give general causes for destitution, because reliable figures, covering any considerable portion of our population, have not yet been furnished upon which premises can be based.

"A cardinal principle of scientific charity is to search out causes of distress, in order that work may be begun at the foundation of the trouble. Yet, with all the facilities and opportunities in the hands of the seventy-eight societies in the United States, nothing has ever been given to the economist of sufficient basic value for the study of sources of poverty.

"The blanks as prepared by the New York society, pursuant to the resolution of the meeting at Buffalo, are inexpensive, and the labor of filling them out from week to week is not great; and we urge, with the utmost earnestness, that every society in the country should at once devote its attention to this work, which is by no means the least important it can perform."